Beyond Groceries: Financial Confidence and the Gender Gap in Inflation Expectations*

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Abstract

The gender gap in inflation expectations, i.e., women reporting systematically higher expectations in consumer surveys, has been attributed to women's greater involvement in grocery shopping and thus exposure to volatile food prices. However, this analysis overlooks a crucial factor: Using data from a German household panel, I show that this effect occurs only among those with low financial confidence. Among those with high financial confidence, the gender gap in inflation expectations disappears. The interaction of financial confidence and shopping experience can be explained through the lense of a simple Bayesian learning framework. Observing more volatile signals increases mean expectations of a group of agents only whenever this group is also characterized by a flat prior.

Keywords Consumer Inflation Expectations, Gender, Financial Literacy

JEL Codes E31, E71, G53

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Introduction

The gender gap in inflation expectations is an established phenomenon. Using a 1977 survey of Swedish households, Jonung (1981) first found that women had significantly higher inflation perceptions, attributing this to their "lived experiences" in grocery shopping as food prices rose faster in the 1970s. Since then, the gap has been observed across a wide range of geographies, survey designs and experimental settings.[1] On average I find a gap of about 1pp. in Germany and 2pp. in the US,[2] which is substantial given inflation targets around 2%.

Understanding the potential causes for this gender gap is important. On the micro-level, higher inflation expectations have been associated with lower life satisfaction (Di Tella et al., 2001) and savings for retirement (Vellekoop & Wiederholt, 2019), for the latter a gender gap is an established fact (Lusardi & Mitchell, 2008). Further, the gender gap concerns central bank communication with the wider public (Coibion et al., 2022, 2023). Women hold the majority of consumer spending in advanced economies (Silverstein & Sayre, 2009) so their consumption-savings plan has large macro consequences. Higher inflation, associated with higher economic uncertainty (Reiche & Meyler, 2022) may reduce consumer spending (Coibion et al., 2024). Efforts should thus be made to understand how women's expectations are formed.

The dominant interpretation for the gender gap is that traditional gender roles lead women to engage more in grocery shopping (D'Acunto & Weber, 2024; D'Acunto et al., 2021; Jonung, 1981), exposing them to more volatile price signals. This can cause overestimation due to a disproportional focus on price increases (Dräger et al., 2014). In this paper, I show that this *experience channel* alone is insufficient to explain the gender gap. Instead, I introduce the *financial confidence channel* as additional mechanism: Consumers with high financial confidence may listen to financial news and macroeconomic developments and thus have a more precise idea of possible values of inflation while those with lower confidence may refer more to their recent price experiences, for instance their grocery shopping. According

[1] Brischetto and de Brouwer (1999) for Australia; Bryan and Venkatu (2001) for a survey on Ohioan consumers; Palmqvist and Strömberg (2004) for Sweden, Pfajfar and Santoro (2010) for the US Michigan Survey; Blanchflower and MacCoille (2009) for the UK; Leung (2009) for New Zealand; Del Giovane et al. (2008) and Corduas (2022) for Italy; Bruine De Bruin et al. (2010) and Armantier et al. (2016) for the RAND American life panel; Arioli et al. (2017) and Lindén (2015) and Reiche and Meyler (2022) for a range of EU countries; D'Acunto et al. (2021) for the Chicago Booth Expectations and Attitudes Survey; Dräger and Nghiem (2020) for Germany and Abildgren and Kuchler (2021) for Denmark are a non-exhaustive list of authors mentioning this empirical finding.

[2] Appendix C.1 shows that while higher age, income, and education reduce the gender gap (see interaction terms in Table 9, even in combination they only close it for very high values.

to this hypothesis, traditional gender norms are thus only relevant in explaining the gender gap for consumers with low financial education.

To formalise this hypothesis, a Bayesian framework with log-normally distributed signals and a conjugate log-normal prior is employed. Heterogeneous experiences between two types of agents are modelled through heterogeneous signals. As the noise of the unbiased signals increases (i.e. as the individual observes more volatile prices, for instance due to grocery price exposure), the expected value of the posterior distribution also increases, suggesting higher average expectations for women in traditional gender roles. This is a feature of the right-skewed log-normal distribution. However, this effect only occurs when the prior is flat. I interpret a flat prior as a sign of low financial confidence: Those who are less confident in their ability to understand financial and macroeconomic matters will have a wider range of possible values and are less inclined to rely on their own intuition, hence they have greater uncertainty around their prior beliefs. This highlights the role of financial confidence as a second channel relevant in explaining the gender gap. The simple, intuitive framework thus captures two hypotheses to explain the observed differences between female and males.

An empirical analysis using data from the Bundesbank Online Panel – Households (BOP-HH, 2019-2022)[3] shows that indeed grocery shopping increases mean expectations for individuals with low financial confidence while decreasing them for those with high confidence. Since women often have lower financial literacy and financial confidence, the effect of grocery shopping gets amplified. This main empirical result is summarized in Figure 1, which shows the distribution of financial confidence among German male and female consumers as well as the estimated effect of grocery shopping on inflation expectations. If one considers both factors in isolation, the impact of financial confidence exceeds that of experience.

When possible, I complement the German data with evidence from the Survey of Consumer Expectations by the Federal Reserve Bank of New York (SCE, 2013-2020) and the Michigan Survey of Consumers (MSC, 1978-20232), both set in the US. This provides external validity for my results geographically and historically. I provide evidence supporting the financial confidence channel by demonstrating, that there is no gender gap in inflation expectations in the high confidence sample. Further, removing outliers beyond the 80th percentile in the inflation expectations distribution closes the gender gap fully. In addition, I show that (a) the gender gap persists for singles, who can be assumed to engage symmetrically in grocery shopping and (b) periods of high food price inflation are not correlated with an

[3]The survey is best suited for this analysis since it measures respondents household responsibilities, including grocery shopping, and includes a financial literacy test (Lusardi & Mitchell, 2007) from which confidence can be inferred.

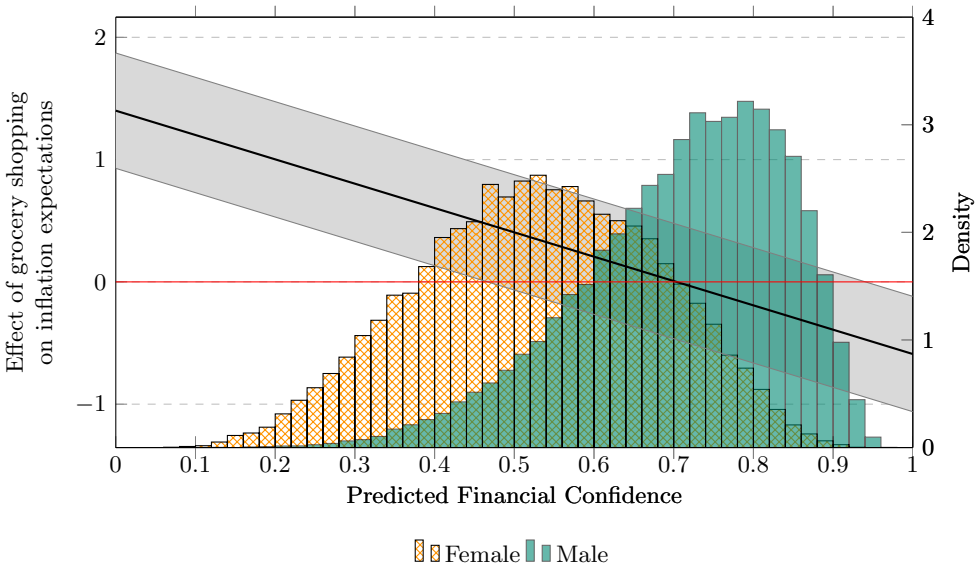


Figure 1: The effect of grocery shopping involvement on inflation expectations for different levels of financial confidence

Notes: Figure 1 plots the predicted effect of grocery shopping involvement on inflation expectations for different levels of financial confidence in the black line ($f(x) = 1.4 - 1.99 * x$). The full regression results are shown in Table 4, column (5). The grey area indicates 95% confidence bands (standard error: 0.47). How grocery shopping is measured will be explained in Section II and financial confidence in Section II. The histograms show the density of the male (green) and female (orange, crosshatched) distribution of financial confidence scores.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; own calculations

increase in the gender gap. For both exercises, I use all three household panels. Thus, I provide additional evidence that the experience hypothesis alone cannot account for the difference between male and female inflation expectations.

These results contribute to two areas of prior research: One that explains heterogeneity in inflation expectations through heterogeneity in signals, and another one that emphasizes the role of interpretation. Initially emphasized by Jonung (1981) and later formalized by the works of Malmendier and Nagel (2016), heterogeneity in experiences (local price signals) may matter and explain systematic demographic differences (D'Acunto & Weber, 2024). With regard to the gender gap, D'Acunto et al. (2021) show using intra-household data of heterosexual, married couples that the gender gap is indeed most prevalent within households when men do not partake in grocery shopping, while in households with an equal share, the gap diminishes. In addition, heterogeneity may arise due to differential ability to process signals received. Bruine De Bruin et al. (2010) suggest that individuals with lower financial literacy rely largely on personal experiences, while financially literate individuals interpret inflation as a more abstract macro concept. Indeed, there is a strong connection between cognitive abilities and inflation expectations (Burke & Manz, 2014; D'Acunto et al., 2019).

I contribute to both strands empirically as well as theoretically. My Bayesian framework captures the effects of the noisy information literature and shows that when the prior is log-normal, making signals noisier can increase the posterior without introducing biases. However, it links this to the interpretation literature by pointing out that for signal volatility to matter, priors need to be flat. To my knowledge, I am the first to integrate financial confidence modelled as prior precision into a Bayesian framework to show that higher uncertainty about an outcome can indeed drive average expectations upwards and is an important condition for the pure experience channel to operate. This can be reconciled with the findings of D'Acunto et al. (2021) as women in "traditional" households may differ from those who share household chores equally in their financial confidence. Further, I run empirical tests on both channels with a focus on the gender gap in inflation expectations.

This paper is structured as follows: Section I introduces the Bayesian framework, Section II describes the data and measurement, Section III presents the key empirical results, and Section IV provides further evidence for the financial confidence channel. Finally, Section V highlights future research avenues and Section VI concludes.

I Bayesian Framework

I start with a Bayesian framework to illustrate the two hypothesized channels causing the gender gap in inflation expectations: experience and confidence. I model differences in experiences, such as grocery shopping activity, as differences in the distribution of the signals received. An agent who visits grocery stores frequently observes more volatile prices as food prices are fundamentally more volatile than the core component of the consumption basket; hence, the agent will receive more volatile signals. On the other hand, I capture differences in financial confidence as differences in prior precision. An agent with less confidence in their financial literacy will place less weight on their own forecast and is thus more reliant on the signals she receives. The framework highlights how these two channels can interact. Intuitively, if an agent's prior is imprecise, such that little weight is placed on own initial forecasts, signals matter more as they become the dominant source for information about inflation. I first present the basic framework and then explore the impact of changes in signal and prior precision. For simplification, the framework is shown for a representative agent.

Let θ denote inflation 12 months ahead, an unknown random variable. The representative agents prior belief about future inflation is assumed to follow a log-normal distribution, such that

$$\log \theta \sim \mathcal{N}\left(\mu_0, \frac{1}{\tau_0}\right).$$

Lower prior precision, i.e. a smaller τ_0 could be caused by lower financial confidence leading to higher uncertainty around individual point forecasts. The framework allows me to test the consequences of lower prior precision on average expectations of agents. In addition, the agent receives a signal x about future inflation. Signals are unbiased but contain some noise, reflecting heterogeneity in inflation experiences given by heterogeneous consumption baskets,

$$\log x = \log \theta + \epsilon,$$
$$\text{where } \epsilon \sim \mathcal{N}\left(0, \frac{1}{\tau_x}\right).$$

If the agent shops for goods with volatile prices (such as groceries) she will receive signals with lower precision, i.e. with a smaller τ_x. Notice, that unbiasedness of signals allows me to show that signal volatility alone can affect mean expectations, such that purely by observing more volatile grocery prices an individual's inflation expectation can increase. Relaxing this assumption would increase the effects discussed in the next section, which can thus be interpreted as "lower bound estimates". The log-normal prior is chosen because it is bounded at zero and features a heavy tail. This choice aligns with observations in the data: (1) there

appears to be a zero lower bound in inflation expectations (Gorodnichenko & Sergeyev, n.d.);[4] (2) a majority of agents have expectations in line with central bank targets, but there are possible tail events to the right; (3) the observed cross-section of inflation expectations is approximately log-normal (see Figure A.1 in the Appendix). Similarly, the log-normal signal is motivated by (1) behavioral biases that imply consumers pay more attention to price increases than price decreases (Dräger et al., 2014), requiring a heavy tailed asymmetric distribution, and (2) allowing for analytical tractability due to the conjugate prior. The asymmetry of the log-normal distribution is a key element of the framework.

The agent updates her beliefs about θ based on the observed signal using Bayes' rule (see Appendix A.2),

$$\log \theta | x \sim \mathcal{N}\left(\hat{\mu}, \frac{1}{\hat{\tau}}\right),$$

where $\hat{\mu}$ represents the mean of the logged posterior inflation expectations and $\hat{\tau}$ the corresponding precision given by:

$$\hat{\mu} = \frac{\tau_0 \mu_0 + \tau_x \log x}{\tau_0 + \tau_x}, \tag{1}$$

$$\hat{\tau} = \tau_0 + \tau_x. \tag{2}$$

The expected value of θ under the posterior distribution is simply the mean of its posterior distribution. It depends directly on the precision of priors and signals and thus on the agents confidence in her own beliefs and the price signals she receives.

$$\mathbb{E}(\theta | x) = \exp\left(\hat{\mu} + \frac{1}{2\hat{\tau}}\right) = \exp\left(\frac{\tau_0 \mu_0 + \tau_x \log x + \frac{1}{2}}{\tau_0 + \tau_x}\right) \tag{3}$$

Channels of the gender gap

The framework can be used to explain heterogeneity in observed point forecasts, particularly those between men and women. I show comparative statics for the effects of shocks to prior precision and signal variance. While using a representative agent framework for illustrative purposes, the framework can easily be interpreted as featuring two groups of agents. For instance, let women experience greater shocks to both prior precision and signal volatility.

[4] In the surveys used in the empirical section of this paper reaches from 0.002% in the BOP-HH to 3.24% in the MSC and 7.04% in the SCE. This is in line with estimates from the authors for a range of EU countries, the US and Japan. This feature is a feature of the chosen functional form, relaxing the zero lower bound would not impact the results as long as the asymmetry is retained.

Beginning with the role of shopping experience, I assume that the composition of an agent's shopping basket may affect the signal precision parameter τ_x. Shopping for groceries is thus connected to a lower τ_x. In this application, the signal remains unbiased; groceries are assumed to have the same level of inflation as other goods. The framework reveals that the expected inflation expectation is increasing in signal volatility whenever $\log x$ exceeds μ_0 by less than half of the prior variance $\frac{1}{\tau_0}$.

$$\frac{d\mathbb{E}(\theta|x)}{d\tau_x} < 0 \iff \log x - \mu_0 < \frac{1}{2\tau_0} \tag{4}$$

The computations can be found in Appendix A.3.1. Notice that the condition in (4) will always be satisfied when $\mu_0 > \log x$. This indicates that when consumers prior expectations exceed the signal, making the signal more volatile will always increase expectations since the signal becomes less reliable. In other words, those with high prior expectations do not revise them downwards if the price signals they receive become more volatile. Further, the condition relaxes when the prior is flat, i.e., prior precision τ_0 is small, such that the agent relies more on the signals received. When priors are sufficiently flat, the agent may revise her expectations upwards as signals become more volatile even when signals on average exceed the prior.

Proposition I.1 *Consumer inflation expectations are increasing in signal volatility whenever* $\log x - \mu_0 < \frac{1}{2\tau_0}$. *This condition has two features:*

1. *The condition is always satisfied when average prior expectations exceed the average of the signal* $\mu_0 > \log x$.

2. *The condition relaxes when priors are imprecise and* τ_0 *is small.*

In summary, under the assumption of a log-normal signal and its conjugate prior, increases in the noise of the signals can indeed increase the expected value of the posterior distribution. This captures and formalizes the argument of the experience hypothesis: women observing higher volatility through higher observed food prices have increased inflation expectations. However, this is facilitated by small prior precision. In contrast, a tight prior may cause mean expectations to decrease when the environment is noisier. Thus, it is important to analyze the consequences of prior heterogeneity, which may be caused by different levels of financial confidence.

Financial confidence may impact the parameters of the prior distribution μ_0 and τ_0 such that an agent with lower confidence has a flatter prior, i.e. a lower τ_0. It has been shown that women have lower confidence about their own financial literacy (Bucher-Koenen et al., 2021).[5] Low confidence may imply higher uncertainty around point forecasts which can be modelled as lower precision. Intuitively, this reflects that individuals with lower financial confidence may have a less formalized idea of price changes when observing prices. Subsequently, I will discuss the comparative statics of a decrease in τ_0 on $\mathbb{E}(\theta|x)$. The computations can be found in Appendix A.3.2.

$$\frac{d\mathbb{E}(\theta|x)}{d\tau_0} < 0 \iff \mu_0 - \log x < \frac{1}{2\tau_x} \tag{5}$$

Heterogeneity in priors can also give rise to heterogeneous expectations when signals received are identical. Reduced prior precision will always increase average expectations when signals exceed the prior. Similar to before, this makes the agent rely less on own forecasts and so the higher signals transmit directly to the expectations. Just as condition (4) relaxes with the prior being flat, condition (5) relaxes when signals are imprecise.

Proposition I.2 *Consumer inflation expectations are increasing in prior imprecision whenever* $\mu_0 - \log x < \frac{1}{2\tau_x}$. *This condition has two features:*

1. *The condition is always satisfied when signals exceed the average of the prior* $\log x > \mu_0$.
2. *The condition relaxes when signals are volatile and* τ_x *is small.*

In the Bayesian framework with log-normal priors and signals, noisy environments caused by grocery shopping and low financial confidence can individually be a cause for higher inflation expectations. Moreover, they interact: The framework shows that noisy signals increase expectations when priors are flat. Simultaneously, low financial confidence (modelled as flat priors) increases expectations when signals are imprecise.

The conditions reveal that there is a combination of values for $\log x$, μ_0, τ_x and τ_0 for which both conditions, (4) and (5) hold: $\mu_0 \in [\log x - \frac{1}{2\tau_0}, \log x + \frac{1}{2\tau_x}]$. Outside of this interval at least one of the conditions will always hold.

Proposition I.3 *For a given* $\log x$, *whenever* $\mu_0 \in [\log x - \frac{1}{2\tau_0}, \log x + \frac{1}{2\tau_x}]$ *the agent's inflation expectation* $\mathbb{E}(\theta|x)$ *are increasing in both, higher signal volatility* $\frac{1}{\tau_x}$ *and prior imprecision* $\frac{1}{\tau_0}$. *Otherwise, the agent's inflation expectation* $\mathbb{E}(\theta|x)$ *are increasing in either higher signal*

[5] The authors show that women perform equally well in financial literacy tests when no "don't know" answer is provided, but worse when such option is not available.

volatility $\frac{1}{\tau_x}$ *or prior imprecision* $\frac{1}{\tau_0}$.

The framework is well suited to explain the interaction of the two channels hypothesized to explain the gender gap in inflation expectations. It shows that if women on average observe more volatile price signals through greater involvement in grocery shopping, they may have higher expectations than men. Similarly, if women on average have lower confidence in their own forecasts they could also have higher expectations. Both channels complement each other: observing volatile prices will increase expectations when the individual is less confident. This makes sense intuitively if those confident about their own financial literacy rely more on aggregate news while those with lower confidence rely on their day-to-day experiences.

The remainder of this paper will show this complementarity empirically. For German consumers there is an interaction effect between grocery shopping and financial confidence when predicting inflation expectations.

II Data

My primary data source is the Bundesbank Online Panel of German consumers from April 2019 until September 2022.[6] This survey is particularly suited to analyze the gender gap in inflation expectations because it contains individual-level data on financial literacy and household responsibilities including grocery shopping, thus allowing me to test both hypotheses on the same individuals. Data for the BOP-HH has been collected regularly since April 2020. I use data until September 2022. In addition, there are three months of pilot phase from April-June 2019. Approximately 2000 participants are initially drawn randomly from a larger pool of candidates recruited via telephone. The participants complete an online survey with various questions ranging from macroeconomic assessments and expectations to political issues. Demographic characteristics are recorded by self-assessment; therefore, the terms "female" and "women" in my analysis refer to self-identified gender. The survey includes the option to not choose a binary gender, and few candidates do so; these responses are excluded here. I also exclude all participants who do not give an inflation point forecast. Inflation expectations in the survey are measured quantitatively. At first, individuals are presented with a short definition of inflation[7] and are asked if they expect inflation or deflation in the coming 12 months. Subsequently, they indicate their anticipated inflation or deflation rate

[6]DOI: https://doi.org/10.12757/Bbk.BOPHH.202204.01. Disclaimer: The results published and the related observations and analysis may not correspond to results or analysis of the data producers.

[7]Inflation is the percentage increase in the general price level. It is mostly measured using the consumer price index. A decrease in the price level is generally described as "deflation".

Survey	Time/Place	Participants	Wording
BOP-HH	Apr.2020-Sep.2022, DE	2000/month	*inflation/deflation* + (definition) from 0-100 + Financial literacy test + Household responsibilities
SCE	Jun.2013-Nov.2020, US	1200/month	*inflation/deflation* from 0-100 + Financial literacy test
MSC	Jan.1978-Dec.2022, US	500/month	*prices in general* from 0-95, probing $> 5\%$

Table 1: Features of the three surveys

numerically. Answers are limited to a range of 0 to 100. Additionally, the survey elicits uncertainty around the point forecast through probabilistic bins.

I complement this survey with two established consumer surveys, the Michigan Survey of Consumers in the US from June 1978 until January 2023 (MSC);[8] and the Federal Reserve Bank of New York Survey of Consumer Expectations in the US from June 2013 until November 2020 (SCE).[9] Adding these surveys allows me to explore a longer time horizon than the short period of the BOP-HH, which was also heavily influenced by the Covid-19 pandemic, and provides external validity by bench-marking results to the US. Further, including the SCE adds robustness to my computation of financial confidence and addresses internal validity concerns. All surveys are summarized in Table 1.

Experience and financial confidence in data

While the BOP-HH is the only dataset that contains information on the respondents' grocery shopping experience, both SCE and BOP-HH contain financial literacy questions that help me compute a measure of confidence.

Measuring experience

Inference of differentiated experience is possible in the BOP-HH due to a question regarding household responsibilities introduced in April 2021, namely everyday purchases (*shop_groceries*), major purchases (*shop_major*), meal preparation (*prep_meals*) and financial decisions (*decide_finance*). Respondents indicate if they are not involved in the task (0),

[8]Source: University of Michigan, Survey Research Center, Surveys of Consumers, available at https://data.sca.isr.umich.edu/.

[9]Disclaimer: © 2013-2020 Federal Reserve Bank of New York (FRBNY). The SCE questions are available without charge at http://www.newyorkfed.org/microeconomics/sce and may be used subject to license terms posted there. FRBNY did not participate in or endorse this work, and FRBNY disclaims any responsibility or legal liability for the administration of the survey and the analysis and interpretation of data collected.

Table 2: Traditional gender norms in the German households

	shop_groceries	shop_major	prep_meals	decide_finance	single
Men	0.47	0.59	0.35	0.70	0.41
Women	0.75	0.56	0.76	0.60	0.50

Non-single sample: N=26,595
Full sample: N=48,146

Notes: Average scores for household roles and experience variables for men and women not living alone. Variables are ranked from 0 (not involved) to 1 (solely responsible). The last column shows the share of single households for men and women from the full sample.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; own calculations

engage jointly with other household members (0.5) or are solely responsible for all the work (1). Since the question is only asked for the first time an individual participates in the survey, I assume that household chores remain constant over time in the panel. Further, the variable is only asked for non-singles. The analysis will show both full sample and non-single sub-samples separately and where household experiences are included focus on the households with more than one member.

The data reveals that traditional gender norms are still present in German households. Table 2 compares grocery shopping, meal preparation, financial decision making and major purchases across male and female samples. As anticipated, the female respondents appear significantly more involved in grocery shopping and meal preparation but less involved in financial planning in households that involve more than one member. Major purchases are balanced between the samples such that no clear gender roles emerge. Men in the data are less likely to live alone. The focus of this analysis is the variable *shop_groceries* as it is a direct measure of whether an individual frequently observes food prices.

Observation II.1 *Traditional gender norms persist in Germany. Women in the BOP-HH are more often responsible for grocery shopping in households with more than one member.*

Measuring financial confidence

I utilize data from the BOP-HH and SCE, which include micro-level financial literacy via a standardised financial literacy test (Lusardi & Mitchell, 2007). The test score ranges from 0 to 3, calculated from three questions covering compound interest, inflation, and risk.[10] Correct

[10]Detailed question wording can be found in Appendices B.1 and B.2.

answers earn one point each, while "don't know" responses are marked as incorrect. The SCE provides a consistent financial literacy score over time, whereas the BOP-HH includes the test only in January 2022. To measure confidence and recover a measure for the full sample, I use a combination of variables related to confidence to predict financial literacy out-of-sample.[11] This allows me to focus of the confidence components in financial literacy. I assume that confidence forms one component of financial literacy and can be recovered. Below I introduce the variables used in the prediction exercise.

First, following Binder (2017) and Reiche and Meyler (2022), I derive a rounding measure (*round*). According to the "Round Numbers, Round Interpretations" hypothesis in linguistics (Krifka, 2009), individuals uncertain about the precise value use the nearest round number. In the context of inflation, this implies that those uncertain about future inflation may be inclined to predict inflation of around 0, 5 or 10 rather than more precise digits.[12] Most participants give non-rounded responses (79.43% in the BOP-HH and 66.70% in the SCE).[13] Second, I use self-reported interest (*qinterest*) and ease of survey (*qeasy*, only in BOP-HH) from feedback questions. These are about all the topics of the survey, inflation being one core element. Assuming interest correlates with confidence in answering, these responses help estimate financial confidence. Note, however, that feedback is not given purely on inflation. The surveys include many other political topics and economic indicators, so a respondent could be confident about inflation but have difficulty evaluating other topics. Lastly, I control for previous survey participation (*refresher*) as the learning-through-survey effect can be substantial in household panels (Kim & Binder, 2020) such that earlier involvement may boost confidence.

I run an ordered logit regression with the test score as dependent variable and the measures above as explanatory variables. This allows creating a larger BOP-HH sample while verifying results with the SCE. Appendix Table 8 shows that rounding lowers financial literacy scores, while interest and ease positively correlate with higher scores. Surprisingly, being a refresher has a negative coefficient in both surveys. Gender also impacts scores similarly

[11] I compute robustness exercises for the BOP-HH measure using the SCE full sample.

[12] Reiche and Meyler (2022) show in detail how the distribution of the responses indicates that there are indeed three groups of respondents, those responding in digits ("certain"), those responding in fives ("uncertain") and those responding in multiples of ten ("highly uncertain"). These can also be found in a histogram of the quantitative inflation expectations in both surveys (see Appendix Figure C.1). Most prominently, it displays a heavier tail for females.

[13] This differs from the findings of Reiche and Meyler (2022), who estimate a share of precise respondents of around 25% in 2019 and after. One possible explanation for the difference could be that the authors use data from the European Commission Consumer Survey which records an inflation expectation of zero for all respondents, qualitatively indicating that inflation "will stay about the same". In contrast, the BOP-HH and SCE do not directly link qualitative and quantitative questions. This explains the lower share of "zero" respondents in both surveys, which are classified as "rounders" in the analysis.

across both surveys. Financial confidence is constructed as the predicted probability of scoring 3 out of 3 in the financial literacy test using the ordered logistic regression coefficients. To verify that low confidence is associated with higher uncertainty in point forecasts (as modelled in the Bayesian framework), I examine the inverse relationship between confidence scores and the interquartile range of fitted probability distributions.[14] The Pearson correlation coefficient between the predicted financial confidence score and the fitted interquartile range is -0.1235 in the BOP-HH and -0.1312 in the SCE, both significant at $p < 0.001$. Appendix Figure B.1 illustrates this negative correlation.

Just as the experience hypothesis relies on the presence of traditional gender norms as shown above, the financial confidence hypothesis relies on two assumptions: (1) Women have lower financial confidence, and (2) low financial confidence increases expectations through a heavy right tail.

There is evidence that women perform worse in standardized financial literacy tests (Bucher-Koenen et al., 2014; Lusardi & Mitchell, 2008) which is driven by their lower confidence (Bucher-Koenen et al., 2021). Table 3 Panel A summarizes financial confidence scores and averages of the predictors discussed above for men and women in Germany and the US. In both countries, women have significantly lower financial confidence scores as they display much higher uncertainty and less interest in the topics around inflation. The only variable that shows no significant difference compared to men is *refresher*.

Observation II.2 *Women in the BOP-HH and SCE perform worse on standardized financial literacy tests. They are also shown to be less confident, have higher uncertainty of their expectations, round more often and find the questions less easy and interesting.*

The hypothesis also assumes that financial confidence impacts inflation expectations through higher uncertainty, i.e., a flat prior. Financial literacy significantly influences inflation expectations (Burke & Manz, 2014; D'Acunto et al., 2019). One channel causing this result is that lower financial confidence (naturally related to literacy) increases uncertainty, skewing expectations upward. The survey design influences this direction. Consumers typically provide point forecasts within the 0-100 range, asymmetrically around the 2% inflation target. If those with a flatter prior select a middle-range value, it results in an upward bias. This is demonstrated in Section I, where a flatter log-normal prior increases average expectations despite unchanged signals.

[14] Probabilistic questions have been used in Engelberg et al. (2009) in the context of the Survey of Professional Forecasters and for consumers in Armantier et al. (2013). I follow the procedure applied in both papers to exploit the probabilistic question.

Table 3: Financial confidence and inflation expectations of men and women

	BOP-HH *N=91501*		SCE *N=113165*	
	Men	Women	Men	Women
Panel A: Financial confidence				
qeasy	3.28	3.01		
	(0.86)	(0.86)		
qinterest	3.78	3.59	3.78	3.68
	(0.86)	(0.89)	(0.98)	(1.00)
refresher	0.65	0.63	0.87	0.86
	(0.48)	(0.48)	(0.34)	(0.35)
round	0.18	0.25	0.23	0.43
	(0.38)	(0.43)	(0.42)	(0.5)
$P(\hat{test} = 3)$	0.71	0.53	0.27	0.17
	(0.13)	(0.15)	(0.3)	(0.21)
Panel B: Inflation Expectations				
π_t^E	4.66	5.64	4.01	6.04
	(4.42)	(6.31)	(8.01)	(13.73)
π_t^E (low $P(\hat{test} = 3)$)	4.98	5.84	4.34	6.3
	(5.17)	(6.68)	(8.03)	(13.37)
π_t^E (high $P(\hat{test} = 3)$)	4.51	4.87	3.69	5.77
	(4.02)	(4.56)	(7.99)	(14.1)

Standard deviation in parentheses.

Notes: Panel A: Average values of financial confidence variables of men and women in two surveys. $P(\hat{test} = 3)$ is the predicted probability of scoring 3 on the financial literacy test from the ordinal logit regression. *refresher* is a dummy for previous survey participation, *round* is a dummy for a rounded point forecast, and *qinterest* and *qeasy* are ordered categorical feedback responses on survey interest (1: very interesting - 4: not interesting at all) and difficulty (1: very difficult - 4: very easy). Difficulty is not asked in the SCE.
Panel B: Average inflation point forecasts (12 months ahead) for men and women as well as split by high or low financial confidence. High denotes $P(\hat{test} = 3)$ above the median.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; Federal Reserve Bank of New York (FRBNY), SCE, June 2013 - November 2020; own calculations

Using the derived confidence measures, I split the sample into a high and a low financial confidence group (using the median predicted score as cutoff). Table 3 Panel B shows that for both men and women those with high confidence have lower inflation expectations.

Observation II.3 *There is a confidence gap in inflation expectations for both men and women.*

III The Effects of Financial Confidence and Shopping Experience

Heterogeneity in experiences and in financial confidence are not mutually exclusive hypotheses for explaining the gender gap in inflation expectations. The Bayesian framework in Section I demonstrates that these parameters are complementary: low financial confidence increases the impact of experiences, and the effect of a flat prior is amplified when signals are noisy.

Grocery experiences matter for those with low financial confidence

Using the BOP-HH data, which includes information on grocery shopping and financial confidence, I test the interaction of financial confidence and grocery shopping with the following panel regression model:

$$\begin{aligned}\pi_t^E = \beta_0 + \beta_1 female_i + \beta_2 P(\hat{test} = 3)_t + H_i\gamma_1 + P(\hat{test} = 3)_t \times H_i\gamma_2 \\ + X_t\gamma_3 + D_t\gamma_4 + R_i\gamma_5 + \bar{X}_i\theta + v_i + \rho_t,\end{aligned} \tag{6}$$

where π_t^E represents individual i's inflation expectation (point forecast, 12 months ahead) at time t, $female_i$ is a dummy variable for self-identifying as female, $P(\hat{test} = 3)_t$ is a measure of financial confidence, and H_i is a vector of individual level involvement in household activities such as grocery shopping, meal preparation, purchase of major items and financial decision-making (see Section II). The focus here is on grocery shopping, the other activities are used as controls. Demographic controls[15] are summarized in X_t, R_i denotes regional dummies, D_t denotes time dummies and $\bar{X}_i$ denotes the time averages of individual i of age and income.[16] Initially, I focus on respondents in non-single households, but show the full sample for comparison.

[15] age_t records the individual i's age at time t, $educ_i$ is an ordered categorical variable of i's education, inc_t is an ordered categorical variable of the household income of observation i at time t

[16] All three surveys with microdata are of panel structure. Due to my interest in time invariant variables such as *female*, I cannot use fixed effects estimation. I employ an alternative estimator to estimate time invariant variables, while maintaining robustness to endogeneity caused by time-invariant observables: I incorporate between effects of time varying variables in the existing model and apply pooled OLS to the

Table 4: The role of financial confidence and experience

	Inflation expectation (12 months ahead, point estimate)					
	Non-singles					Full sample
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	4.69***	5.43***	4.65***	5.31***	5.16***	5.13***
	(0.22)	(0.25)	(0.28)	(0.30)	(0.71)	(0.74)
female	0.80***	0.53***	0.71***	0.45***	0.42***	0.43***
	(0.06)	(0.08)	(0.07)	(0.08)	(0.08)	(0.06)
$P(\hat{test} = 3)$		−1.68***		−1.67***	−1.49**	−1.47**
		(0.30)		(0.30)	(0.62)	(0.60)
shop_groceries			0.05	0.06	1.40***	1.39***
			(0.09)	(0.09)	(0.42)	(0.42)
shop_major			0.04	0.05	−1.79***	−1.84***
			(0.14)	(0.14)	(0.58)	(0.58)
prep_meals			0.15	0.15	0.64	0.64
			(0.10)	(0.10)	(0.40)	(0.40)
decide_finance			−0.18*	−0.14	−0.02	−0.04
			(0.11)	(0.11)	(0.46)	(0.45)
single						−0.38
						(1.45)
$P(\hat{test} = 3)$×shop_groceries					−1.99***	−1.99***
					(0.62)	(0.61)
$P(\hat{test} = 3)$×shop_major					2.78***	2.83***
					(0.86)	(0.85)
$P(\hat{test} = 3)$×prep_meals					−0.76	−0.75
					(0.59)	(0.58)
$P(\hat{test} = 3)$×decide_finance					−0.20	−0.18
					(0.68)	(0.67)
$P(\hat{test} = 3)$×single						−0.01
						(2.21)
age	−0.01***	−0.01***	−0.01***	−0.01***	−0.01***	−0.01***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
educ	−0.08***	−0.06***	−0.08***	−0.06***	−0.06***	−0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
income	−0.09***	−0.04***	−0.08***	−0.04***	−0.05***	−0.06***
	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)
Observations	26,595	26,595	26,595	26,595	26,595	48,146
R^2	0.14	0.14	0.14	0.15	0.15	0.16

*p<0.1; **p<0.05; ***p<0.01
Standard errors in parentheses.

Notes: Coefficients from a pooled OLS regression of individual 12-month inflation expectations in the BOP-HH. The full model is specified in Equation (6). All regressions incorporate regional controls, between effects, and time fixed effects.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; own calculations

While the results in Table 4 show no significant role for grocery shopping and other household chores in column (3)[17], financial confidence has a substantial impact on inflation expectations. Including financial confidence as an additional variable reduces the size of the gender gap considerably in column (2) compared to the baseline specification in column (1). Adding both experience controls and financial confidence in column (4) does not qualitatively change these observations. However, when interaction terms for experiences with financial confidence are included, the results show that experience does matter. Columns (5) and (6) introduce various experience variables and their interaction terms with financial confidence. The coefficient for female remains largely unchanged, while the coefficient for financial confidence slightly reduces, becoming insignificant due to increased standard errors. Grocery shopping, initially insignificant, becomes positively significant with a negative and significant interaction term. For respondents in the bottom 16.75% of financial confidence (share of women among those observations is 82.25%), grocery shopping significantly raises inflation expectations.[18] Figure 1 visualizes this result. The reverse is true for purchasing major items, traditionally a male-dominated task. Different levels of financial confidence amplify the effects of experience on inflation expectations. Additionally, there are no significant effects of living in a single household beyond the involvement in chores.

Result III.1 *Grocery shopping and meal preparations increase inflation expectations only for the individuals in the lowest quintile of financial confidence distribution which is dominated by women.*

Financial confidence can fully explain the gender gap

Having established that experience matters jointly with financial confidence, this section explores this channel further. It verifies that in both the BOP-HH and the SCE, there is no gender gap in inflation expectations among high financial confidence samples. Even if grocery shopping is unequally distributed among men and women in this sample, tight priors mitigate the mean-increasing effect of observing volatile signals.

transformed model. Between effects are computed as follows:

$$\bar{x}_i = \frac{1}{T}\sum_{t=1}^{T} x_t \tag{7}$$

[17] with the exception of financial decision making which is more a measure of financial literacy than price experiences

[18] Using the coefficients in column (5) of Table 4 and the standard error of the sum of the coefficients on shop_groceries and $P(\hat{test} = 3)\times$shop_groceries (0.1203), the lower bound of the 95% confidence interval for the predicted effect of grocery shopping is positive for $P(\hat{test} = 3) \leq 0.4636$. 16.75% of all observations satisfy $P(\hat{test} = 3) \leq 0.4636$, the share of women of those who do is 82.25%)

To test whether the gender gap in inflation expectations diminishes when controlling for financial confidence, I use a pooled OLS estimation with point forecasts as the dependent variable and various demographic explanatory variables. Unlike the previous model, I include an estimate of financial confidence and interact it with the female dummy:

$$\pi_{i,t}^{E} = \alpha + \beta_1 female_i + \beta_2 P(\hat{test} = 3)_t + \beta_3 female_i \times P(\hat{test} = 3)_t + X_{i,t}\gamma_1 + D_t\gamma_2 + R_i\gamma_3 + \bar{X}_i\theta + v_i + \rho_t, \tag{8}$$

where all variables are defined as before. I test if the gender gap reduces when financial confidence increases: $\beta_3 \leq 0$.

The results are summarized in Tables 5 for the BOP-HH. In the Appendix, Table 10 presents the SCE results. For both surveys, the interaction term in model (3) and (5) indicates that while women with low financial confidence have much higher expectations than their male counterparts, as confidence increases, the gap diminishes. This effect is stronger for the confidence score than for the pure literacy tests score. Figure 2 plots the predicted gender gap along different financial confidence scores computed as $\hat{\Delta}_{\pi^E}^{GG} = \beta_1 + \beta_3 \times P(\hat{test} = 3)$.[19]

Result III.2 *The gender gap in inflation expectations diminishes as financial confidence increases and is zero (or negative) for high financial confidence individuals.*

IV Robustness Exercises

To examine the proposed mechanism behind the gender gap in inflation expectations, I conduct three robustness checks using all three available surveys:

1. **Outlier Impact**: I test the sensitivity of the gender gap towards the trimming of outliers. The financial confidence hypothesis suggests that the gap may be driven largely by women with very high, rounded expectations, such that trimming should reduce the gender gap.

2. **Singles Analysis**: I investigate whether the gender gap exists among singles. According to the experience hypothesis, there should be no gender gap among singles since both men and women engage symmetrically in grocery shopping when living alone. However, a financial confidence gap may still exist among singles, leading to asymmetric expectations despite symmetric shopping.

3. **Food Price Inflation Periods**: I assess whether the gender gap widens during periods

[19] A similar plot for the SCE is in the Appendix (Figure C.3).

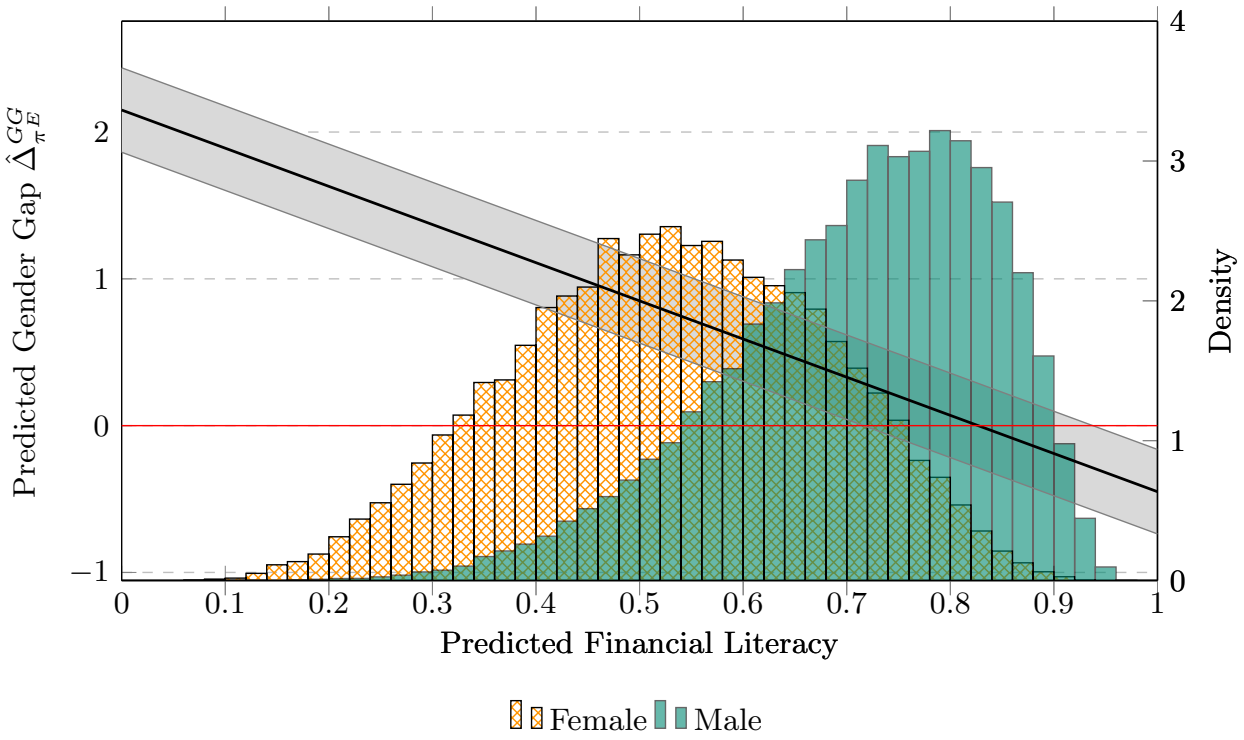


Figure 2: The gender gap for different levels of financial confidence (BOP-HH)

Notes: The black line shows the predicted gender gap in inflation expectations across financial confidence scores ($\hat{\Delta}_{\pi^E}^{GG}(x) = 2.15 - 2.60x$). The full regression results are in Table 5, column (3). The grey area represents the 95% confidence interval (standard error: 0.1468). The histograms display the distribution of financial confidence scores for men (green) and women (orange, crosshatched).

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; own calculations

Table 5: The impact of financial confidence on the gender gap (BOP-HH)

	Inflation expectation (12 month ahead, point estimate)				
	(1)	(2)	(3)	(4)	(5)
Constant	4.69***	5.39***	4.56***	8.03***	7.58***
	(0.17)	(0.18)	(0.19)	(0.56)	(0.62)
female	0.87***	0.54***	2.15***	0.43***	1.30**
	(0.03)	(0.04)	(0.15)	(0.16)	(0.58)
$P(\hat{test} = 3)$		−2.03***	−0.73***		
		(0.16)	(0.20)		
$P(\hat{test} = 3)$×female			−2.60***		
			(0.24)		
fin_lit_test				−0.70***	−0.53***
				(0.11)	(0.15)
fin_lit_test × female					−0.35
					(0.22)
age	−0.01***	−0.01***	−0.01***	−0.01**	−0.01**
	(0.001)	(0.001)	(0.001)	(0.01)	(0.01)
single	−0.34***	−0.21***	−0.23***	−0.17	−0.16
	(0.04)	(0.04)	(0.04)	(0.20)	(0.20)
educ	−0.07***	−0.05***	−0.05***	−0.03	−0.03
	(0.005)	(0.01)	(0.01)	(0.02)	(0.02)
income	−0.14***	−0.08***	−0.09***	−0.04	−0.05
	(0.01)	(0.01)	(0.01)	(0.04)	(0.04)
Time dummies	Yes	Yes	Yes	No	No
Region dummies	Yes	Yes	Yes	Yes	Yes
Between effects	Yes	Yes	Yes	No	No
Observations	91,501	91,501	91,501	2,916	2,916
R^2	0.16	0.16	0.16	0.03	0.03

*p<0.1; **p<0.05; ***p<0.01
Standard errors in parentheses.

Notes: Regression coefficients from a pooled OLS estimation of individual 12-month-ahead inflation expectations in the BOP-HH. The full model is specified in Equation (8). Columns (4) and (5) replicate (2) and (3) with the computed test score for January 2022.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; own calculations

of high food price inflation, i.e. when women in traditional gender roles observe even higher price increases. This does not necessarily hold if financial confidence is the main channel causing the gender gap.

The confirmation of (1) and rejection of (2) and (3) support the fincnail confidence hypothesis proposed in this paper.

The gender gap driven by the tails

One implication of the financial confidence hypothesis is that the gender gap should disappear when the sample is trimmed to remove outliers in the right-skewed distribution. To test this, I compute the gender gap across deciles of the expectations distribution, controlling for demographics and time periods in three surveys (BOP-HH, SCE, and MSC). I run a regression for each decile of the expectations distribution, with the dependent variable defined as $I_{\pi_t^E \leq \pi_q^E} \times \pi_t^E$, where $I_{\pi_t^E \leq \pi_q^E}$ is an indicator variable for observations with inflation point forecasts below percentile q of the full sample:

$$\begin{aligned} I_{\pi_t^E \leq \pi_q^E} \times \pi_t^E = I_{\pi_t^E \leq \pi_q^E} \times (\alpha + \beta_1 female_i + X_t\gamma_1 + D_t\gamma_2 \\ + R_i\gamma_3 + \bar{X}_i\theta + v_i + \rho_t). \end{aligned} \tag{9}$$

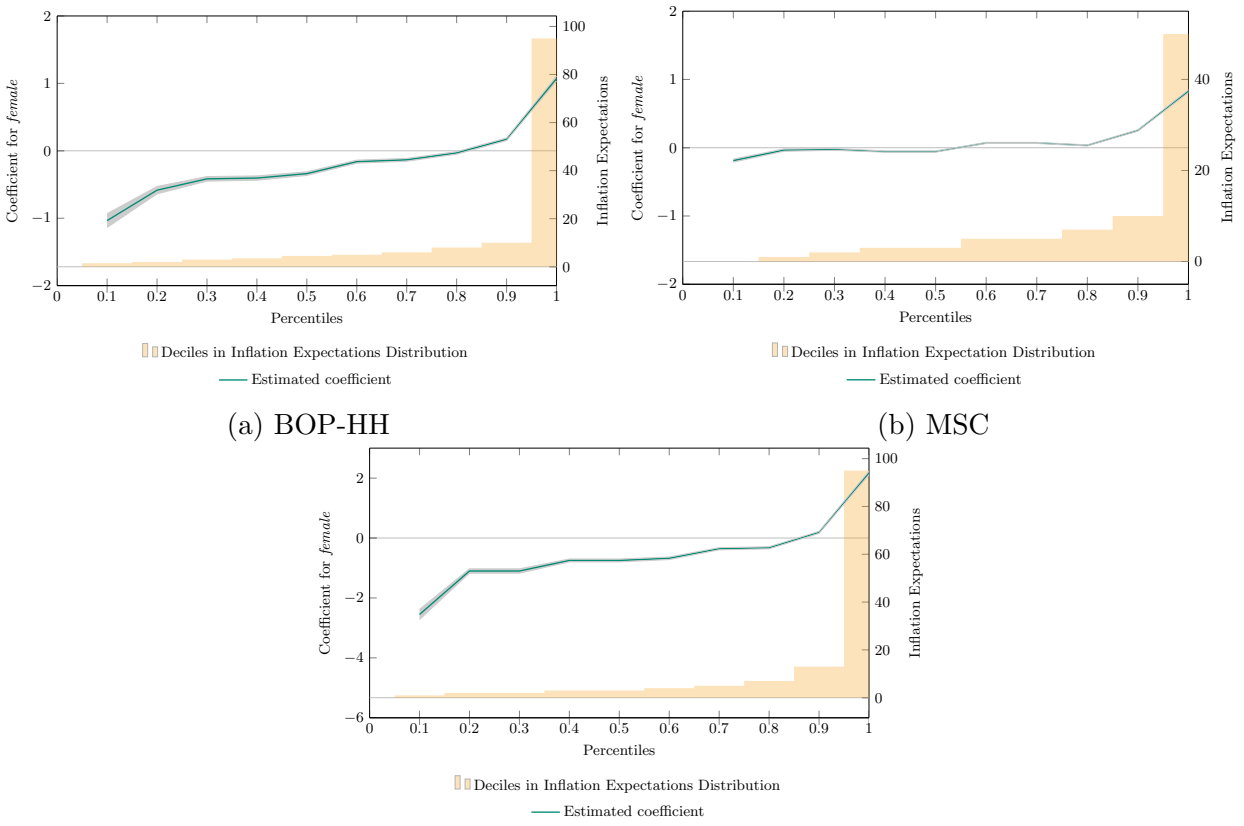
I test whether the gender gap closes when outliers are removed: $\beta_1^{(q_1)} \leq \beta_1^{(q_2)} \Rightarrow q_1 \leq q_2$. Figure 3 plots the coefficient of *female* across percentiles, showing a steady increase as predicted by the financial confidence hypothesis. In samples limited to inflation expectations below the 50th percentile, no positive gender gap is observed. Conversely, for lower percentiles, the gender gap is negative. The regression table is in Appendix, Table 11.

Observation IV.1 *The gender gap in means is driven by the heavy tail in the female distribution. When the sample is restricted to the lowest 50% of inflation expectations, there is no positive gap and at lower percentiles a significantly negative gender gap emerges.*

The gender gap amongst singles

One implication of the pure experience hypothesis is that there should be no gender gap in inflation expectations for single men and women, as singles are likely to engage in grocery shopping irrespective of gender and thus should experience similar inflation levels and volatility.

To test this, I run a panel regression of inflation expectations on a female dummy,



(a) BOP-HH

(b) MSC

(c) SCE

Figure 3: The gender gap along deciles in the inflation expectations distribution

Notes: Estimated regression coefficients for the dummy variable *female* in decile regressions of the inflation expectations distribution (0.1 to 0.9) across three surveys: BOP-HH, MSC, and SCE in the green line. The regression model follows Equation (9). 95% confidence bands are shaded in grey. Orange bars represent the percentiles in the inflation expectations distribution.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; Federal Reserve Bank of New York (FRBNY), SCE, June 2013 - November 2020; University of Michigan, Survey Research Center, MSC, January 1978 - January 2023; own calculations

controlling for age, income, and education. The model is specified as:

$$\pi_t^E = \alpha + \beta_1 female_i + X_t\gamma_1 + D_t\gamma_2 + R_i\gamma_3 + \bar{X}_i\theta + + v_i + \rho_t, \tag{10}$$

where all variables are as defined before. The model is run on two subsamples of each survey, singles (S) and non-singles (N). Under the experience hypothesis, the gender gap should be larger in the non-single sample: $\beta_1^{(N)} - \beta_1^{(S)} > 0$.

Table 6 shows that for all surveys (a) there is a persistent and significant gender gap for both, singles and non-singles and (b) it is not statistically smaller for singles. In fact, in the SCE the gender gap is larger for singles, rejecting H_0. This is novel evidence as D'Acunto et al. (2021) show no evidence for non-married and single individuals, and Jonung (1981) shows no treatment of disaggregated data.

Observation IV.2 *The gender gap is significant and no different between singles and non-singles.*

The gender gap correlated with historical food prices

Under the experience hypothesis, the gender gap is expected to widen in periods of higher food price inflation or price volatility compared to CPI core. This is because in those periods, household members with grocery shopping exposure observe particularly high/volatile prices which increases the level/noisiness of their signals in the Bayesian learning framework.

To analyze this, I use a regression model similar to the previous setup but replace time dummies with variables measuring the difference in food price inflation (CPI_t^{food}) and total inflation (CPI_t^{total}), as well as the moving coefficients of variation of these variables:

$$\begin{aligned}\pi_t^E = \beta_0 + \beta_1 female_i + \beta_2 female_i \times (CPI_t^{food} - CPI_t^{total}) + \beta_3 (CPI_t^{food} - CPI_t^{total}) \\ + \beta_4 female_i \times (\rho_{t,6}^{food} - \rho_{t,6}^{total}) + \beta_5 (\rho_{t,6}^{food} - \rho_{t,6}^{total}) + X_t\gamma_1 + R_i\gamma_2 + \bar{X}_i\theta + v_i + \rho_t,\end{aligned} \tag{11}$$

where, $(CPI_t^{food} - CPI_t^{total})$ measures the gap between a given period's food inflation and total inflation and $(\rho_{t,6}^{food} - \rho_{t,6}^{total})$ represents the gap between the coefficients of variation of food and total inflation over a 6-month moving window.[20] The regression results are reported in

[20]The moving coefficient of variation is defined as follows:

$$\rho_{t,n} = \frac{\sigma_{t,n}}{\bar{x_{t,n}}} \times 100$$

where t denotes the current period, n is the number of periods over which to calculate the moving average and standard deviation, $\bar{x_{t,n}}$ is the moving average and $\sigma_{t,n}$ describes the moving standard deviation computed

Table 6: Comparing the gender gap in inflation expectations for singles and non-singles

	Inflation expectation (12 months ahead, point estimate)					
	BOP-HH		SCE		MSC	
	N	S	N	S	N	S
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	5.57***	5.04***	8.66***	8.39***	7.27***	7.36***
	(0.23)	(0.40)	(0.41)	(0.80)	(0.29)	(0.60)
female	1.30***	1.27***	1.39***	2.01***	0.85***	0.89***
	(0.04)	(0.08)	(0.08)	(0.13)	(0.03)	(0.05)
age	−0.02***	−0.01***	0.01**	0.02***	−0.01***	−0.02***
	(0.001)	(0.003)	(0.003)	(0.004)	(0.001)	(0.001)
income	−0.20***	−0.19***	−0.37***	−0.41***	−0.00***	−0.00***
	(0.01)	(0.02)	(0.02)	(0.03)	(0.00)	(0.00)
educ	−0.10***	−0.08***	−0.46***	−0.58***	−0.24***	−0.26***
	(0.01)	(0.01)	(0.03)	(0.05)	(0.01)	(0.02)
$\beta_1^{(N)} - \beta_1^{(S)}$	*0.0281*		*-0.613****		*-0.0398*	
	(0.092)		*(0.154)*		*(0.057)*	
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes
Between effects	Yes	Yes	No	No	Yes	Yes
Observations	83,704	27,381	74,385	41,106	195,107	66,268
R^2	0.13	0.11	0.03	0.03	0.13	0.10

*p<0.1; **p<0.05; ***p<0.01
Standard errors in parentheses.

Notes: Regression coefficients from a pooled OLS estimation of individual inflation expectations (12 months ahead). The full model is detailed in Equation (10). Due to the SCE's panel structure limitations, no between effects are included for this survey. N indicates households with more than 1 member and S indicates single households. The italics below indicate the gap between the coefficient on female in non-single and single samples along with the standard error.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; Federal Reserve Bank of New York (FRBNY), SCE, June 2013 - November 2020; University of Michigan, Survey Research Center, MSC, January 1978 - January 2023; own calculations

Table 7. Under the experience hypothesis, $\beta_2 > 0$ and $\beta_4 > 0$. However, the analysis reveals that in both the BOP-HH and MSC surveys, the coefficient for the interaction term with the absolute inflation gap (β_2) is significantly negative. This suggests that the gender gap in inflation expectations actually diminishes when food prices are very high relative to core inflation. On the other hand, the interaction with the inflation variability gap (β_4) is found to be insignificant. Additionally, β_3 and β_4 show mixed results: they are significantly positive in the BOP-HH but negative in the SCE, indicating no clear effect on inflation expectations solely from these factors.

Observation IV.3 *The magnitude of the gender gap is unresponsive to the size of food price inflation relative to total inflation.*

V Discussion

Other potential drivers of the gender gap in inflation expectations, such as gender differences in economic pessimism, are not explored in this paper. Economic pessimism, defined by Hey (1984) as skewing expectations towards unfavorable outcomes, could influence inflation expectations. A recent example is the response of household inflation expectations to the Covid-19 pandemic (Binder, 2020). Although studies suggest women may exhibit greater pessimism in various contexts (Jacobsen et al. (2014) on consumer sentiment and stock market performance, Chaney et al. (1998) on election outcomes, Garbarino and Strahilevitz (2004) on online shopping, Lin and Raghubir (2005) on marriage, Lyons et al. (2009) on health and Gwartney-Gibbs and Lach (2016) on war), evidence specific to inflation is lacking. A simple t-test in the BOP-HH indicates no significant difference in general mood between men (mean = 2.12) and women (mean = 2.14, scale 1–4, p-value = 0.0544), such that this hypothesis is not pursued further here. Note that the question is not targeted at inflation in particular. Additionally, recent research (Garriga, 2023) suggests women may express less satisfaction with the Bank of England's work, potentially influencing their perception of inflation negatively. Future studies could also explore the concept of "pinkflation", where products predominantly purchased by women might experience higher inflation rates compared to those purchased by men. Research in this area is currently limited, and scanner data could provide insights into these questions.

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as

$$\text{Moving SD}_t = \sqrt{\frac{1}{n-1}\sum_{i=t-n+1}^{t}(x_i - \overline{x}_t)^2}$$

where x_i is the value at time i.

Table 7: Microlevel effects of high food prices

Inflation expectation (12 months ahead, point estimate)			
	BOP-HH	SCE	MSC
Constant	6.94***	7.77***	7.13***
	(0.12)	(0.20)	(0.06)
female	1.32***	1.61***	0.75***
	(0.05)	(0.07)	(0.02)
CPI_t^{food} - CPI_t^{total}	0.44***	0.03	-0.06***
	(0.01)	(0.02)	(0.01)
female x (CPI_t^{food} - CPI_t^{total})	−0.01	−0.03	−0.09***
	(0.01)	(0.03)	(0.01)
$\rho_{t,6}^{food}$ - $\rho_{t,6}^{total}$	0.10***	-0.01	-0.03***
	(0.005)	(0.01)	(0.01)
female x ($\rho_{t,6}^{food}$ - $\rho_{t,6}^{total}$)	-0.001	0.01	-0.01
	(0.01)	(0.02)	(0.01)
age	0.79***	0.01***	-0.04***
	(0.05)	(0.002)	(0.02)
income	0.03	-0.38***	-0.0000***
	(0.03)	(0.02)	(0.0000)
single	-0.40***	-0.09	-0.16***
	(0.05)	(0.08)	(0.03)
educ	-0.08***	-0.50***	-0.34***
	(0.01)	(0.02)	(0.01)
Between effects	Yes	No	Yes
Regional dummies	Yes	Yes	Yes
Observations	111,085	115,491	259,755
R^2	0.08	0.03	0.03

*p<0.1; **p<0.05; ***p<0.01
Standard errors in parentheses.

Notes: Regression coefficients from a pooled OLS estimation of individual inflation expectations (12 months ahead) including the difference between food and total inflation, and their moving coefficient of variation. The full model is specified in Equation (11). Time dummies are omitted. The SCE lacks between effects as demographic questions are asked only once.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; Federal Reserve Bank of New York (FRBNY), SCE, June 2013 - November 2020; University of Michigan, Survey Research Center, MSC, January 1978 - January 2023; OECD, Prices: Consumer prices, Main Economic Indicators (database), January 1978 - January 2023; own calculations

The empirical section of this paper focuses on financial confidence by isolating it from the broader concept of financial literacy. However, the theoretical framework views this as a manifestation of a flat prior, suggesting it reflects uncertainty rather than confidence. Distinguishing between financial confidence, uncertainty about inflation concepts, and well-informed uncertainty about the future is challenging with the available data. In Section II, I demonstrate that low financial confidence correlates with a wider interquartile range in probabilistic questions—a measure that could encompass both types of uncertainty. Moreover, low financial confidence is also associated with rounding behavior, which typically signifies uncertainty about inflation concepts (see Reiche & Meyler, 2022). Thus, while financial confidence captures uncertainty to a significant extent, disentangling the specific effects of these drivers remains a promising avenue for future research. This would enhance the precision of questionnaire design in capturing these nuanced distinctions.

Another avenue for future research is exploring the behavioral consequences of the gender gap in inflation expectations. The available data do not allow for a thorough analysis of the Euler equation's validity for men and women, as the surveys only capture intent to spend without information on actual spending. The literature is divided on whether consumers adhere to the Euler equation. For instance, Dräger and Nghiem (2020) find supporting evidence using a new survey of German consumers, while Bachmann et al. (2015) show that spending intent (as measured in the MSC) is unresponsive to changes in inflation expectations. These mixed results may stem from differences in survey design, such as the distinction between spending intent and actual spending, as well as geographical variations. In recent work Coibion et al. (2024) show how higher uncertainty reduces spending. Since I show that women's higher inflation expectations can be linked to economic uncertainty, these may translate into lower spending. It is plausible that spending behavior aligns with the Euler equation only for individuals who (a) are not liquidity constrained, (b) possess sufficient financial literacy to understand the impact of inflation on savings, and (c) trust their own literacy enough to base financial decisions on their beliefs.

VI Conclusion

This paper contributes both theoretically and empirically to the literature on inflation expectations. Theoretically, I demonstrate that heterogeneity in observed point forecasts can stem from parameter variations in priors and received signals. Specifically, assuming a log-normal prior distribution, adjusting noise volatility can heighten average inflation expectations, aligning with the established experience hypothesis in literature (D'Acunto & Weber, 2024; D'Acunto et al., 2021; Jonung, 1981). Alternatively, flatter priors due to uncertainty

can similarly raise expected values and posterior distribution variance. Signal volatility heightens average expectations when priors are flat and vice versa. Hence, both forces interact.

Empirically, using BOP-HH data, I find grocery shopping alone inadequately explains inflation expectations. Yet, interactions with financial confidence reveal grocery shopping elevates expectations among those with low confidence but depresses them for high-confidence individuals. My findings thus demonstrate the gender gap as a composite of traditional gender norms and women's lower financial confidence. Controlling for financial confidence can close the gender gap fully. This finding is important for the literature on inflation expectations beyond the gender gap: Low financial confidence causes an upward bias through rounding in periods of low inflation (choosing "5" overestimates 0% inflation), but the bias may in fact be downwards in high inflation periods ("5" underestimates 10% inflation). Thus, survey expectations may appear more anchored in high inflation periods.

I proceed by evaluating the mechanism presented above using the BOP-HH as well as two longer running US surveys, the SCE and the MSC. Restricting expectations to the lowest 50th percentile diminishes this gap, marking a novel exploration into higher distribution moments. Contrary to implications from the standard experience hypothesis, my robustness checks also reveal that the gender gap does not vanish among singles nor heighten during periods of high food price inflation. This challenges experience as the solitary gender gap driver.

The evidence suggests that the dominating experience hypothesis in the literature (D'Acunto et al., 2021) is not enough to explain the gender gap in inflation expectations. Financial confidence emerges as pivotal, with grocery shopping heightening expectations solely within the low-confidence subset, aligning with the framework's predictions. This alternative hypothesis reconciles stylized facts with D'Acunto et al. (2021), suggesting lower financial confidence among married women in traditional roles drives the gender gap.

The fact that the gender gap appears to be driven largely by financial confidence has policy implications. While many women have similar expectations to those of men and appear equally financially literate, there exists a large upper tail of women with lower confidence. This translates into rounded and less precise estimates and matters for female investment and saving behavior. Lusardi and Mitchell (2008) show that women often under-save for retirement, which is worsened by the fact that many reach an older age than male spouses. Expecting higher levels of inflation due to lower confidence rationalizes this result. Further, lower confidence may lead to lower perceptibly to policy communicated in expert language.

If women pay less attention or are less likely to draw the correct conclusions from policy messages due to low levels of financial literacy in the tails and trust in own abilities, they will not adjust behavior as expected. This suggests that policy should focus on (a) improving financial literacy of women and (b) communicate monetary policy in simpler language to address individuals with lower literacy.

References

Abildgren, K., & Kuchler, A. (2021). Revisiting the inflation perception conundrum. *Journal of Macroeconomics*, *67*. https://doi.org/10.1016/j.jmacro.2020.103264

Arioli, R., Lim, Y. C., Sek, S. K., Easaw, J., Golinelli, R., Malgarini, M., Morvan, C., Jenkins, B., Carroll, C. D., Axtell, R., Branch, W., Christ, C., Dickens, W., Dotsey, M., Epstein, J., Goodfriend, M., Manning, J., Mccallum, B., Mehra, Y., ... Schulhofer-Wohl, S. (2017). EU Consumers' Quantitative Inflation Perceptions and Expectations: an Evaluation. *Occasional Paper Series, European Central Bank*, *91*(186). https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op186.en.pdf?c58df51446c7605dd5f939bcc7cd35b3

Armantier, O., Bruine De Bruin, W., Potter, S., Topa, G., Van Der Klaauw, W., & Zafar, B. (2013). Measuring inflation expectations. https://doi.org/10.1146/annurev-economics-081512-141510

Armantier, O., Nelson, S., Topa, G., van der Klaauw, W., & Zafar, B. (2016). The price is right: Updating inflation expectations in arandomized price information experiment. *Review of Economics and Statistics*, *98*(3), 503–523. https://doi.org/10.1162/REST{_}a{_}00499

Bachmann, R., Berg, T. O., & Sims, E. R. (2015). Inflation Expectations and Readiness to Spend: Cross-Sectional Evidence. *American Economic Journal: Economic Policy*, *7*(1), 1–35. https://doi.org/10.1257/pol.20130292

Binder, C. C. (2017). Measuring uncertainty based on rounding: New method and application to inflation expectations. *Journal of Monetary Economics*, *90*. https://doi.org/10.1016/j.jmoneco.2017.06.001

Binder, C. C. (2020). Coronavirus Fears and Macroeconomic Expectations. *The Review of Economics and Statistics*, *102*(4), 721–730. https://doi.org/10.1162/REST{_}A{_}00931

Blanchflower, D., & MacCoille, C. (2009, September). *The formation of inflation expectations: an empirical analysis for the UK* (tech. rep.). National Bureau of Economic Research. Cambridge, MA. https://doi.org/10.3386/w15388

Brischetto, A., & de Brouwer, G. (1999, March). *Householders' Inflation Expectations*, Reserve Bank of Australia. https://catalogue.nla.gov.au/Record/1434103/Details

Bruine De Bruin, W., Van der Klaauw, W., Downs, J. S., Fischhoff, B., Topa, G., Armantier, O., Chien, S., Colvin, T., Forman, D., Fielding, P., Greenwald, D., Gutsche, T., Holbrook, M., & Weerman, B. (2010). Expectations of Inflation: The Role of Demographic Variables, Expectation Formation, and Financial Literacy. *Journal of Consumer Affairs*, *44*(2), 381–402. https://doi.org/10.1111/J.1745-6606.2010.01174.X

Bryan, M., & Venkatu, G. (2001). The Curiously Different Inflation Perspectives of Men and Women. *Economic Commentary*, (November 2001). https://www.clevelandfed.org/newsroom-and-events/publications/economic-commentary/economic-commentary-archives/2001-economic-commentaries/ec-20011101-the-curiously-different-inflation-perspectives-of-men-and-women

Bucher-Koenen, T., Alessie, R. J., Lusardi, A., & Rooij, M. v. (2021, May). *Fearless Woman: Financial Literacy and Stock Market Participation*, National Bureau of Economic Research. https://doi.org/10.3386/W28723

Bucher-Koenen, T., Lusardi, A., Alessie, R., & Rooij, M. v. (2014, December). *How financially literate are women? An overview and new insights*, National Bureau of Economic Research. https://doi.org/10.3386/W20793

Burke, M. A., & Manz, M. (2014). Economic Literacy and Inflation Expectations: Evidence from a Laboratory Experiment. *Source: Journal of Money, Credit and Banking*, *46*(7), 1421–1456. https://doi.org/10.1111/jmcb.12144

Chaney, C. K., Alvarez, R. M., & Nagler, J. (1998). Explaining the gender gap in U.S. presidential elections, 1980-1992. *Political Research Quarterly*, *51*(2), 311–339. https://doi.org/10.1177/106591299805100202

Coibion, O., Georgarakos, D., Gorodnichenko, Y., Kenny, G., & Weber, M. (2024). The Effect of Macroeconomic Uncertainty on Household Spending. *American Economic Review*, *114*(3), 645–677. https://doi.org/10.1257/aer.20221167

Coibion, O., Georgarakos, D., Gorodnichenko, Y., & Weber, M. (2023). Forward Guidance and Household Expectations. *Journal of the European Economic Association*, *21*(5), 2131–2171. https://doi.org/10.1093/jeea/jvad003

Coibion, O., Gorodnichenko, Y., & Weber, M. (2022). Monetary Policy Communications and their Effects on Household Inflation Expectations. *Journal of Political Economy*, *130*(6), 1537–1584.

Corduas, M. (2022). Gender differences in the perception of inflation. *Journal of Economic Psychology*, *90*, 102522. https://doi.org/10.1016/J.JOEP.2022.102522

D'Acunto, F., Hoang, D., Paloviita, M., & Weber, M. (2019). Cognitive Abilities and Inflation Expectations. *AEA Papers and Proceedings*, *109*, 562–66. https://doi.org/10.1257/PANDP.20191050

D'Acunto, F., Malmendier, U., & Weber, M. (2021). Gender Roles produce divergent economic expectations. *Proceedings of the National Academy of Science11818*, *118*(21). https://doi.org/10.1073/pnas.2008534118

D'Acunto, F., & Weber, M. (2024, March). *Why Survey-Based Subjective Expectations are Meaningful and Important* (tech. rep.). National Bureau of Economic Research. Cambridge, MA. https://doi.org/10.3386/w32199

Del Giovane, P., Fabiani, S., & Sabbatini, R. (2008). What's behind "inflation perceptions"? A survey-based analysis of Italian consumers. In *The euro, inflation and consumer's perceptions* (pp. 157–197). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-540-78370-1{_}7

Di Tella, R., MacCulloch, R. J., & Oswald, A. J. (2001). Preferences over inflation and unemployment: Evidence from surveys of happiness. *American Economic Review*, *91*(1), 335–347. https://doi.org/10.1257/aer.91.1.335

Dräger, L., Menz, J. O., & Fritsche, U. (2014). Perceived inflation under loss aversion. *Applied Economics*, *46*(3), 282–293. https://doi.org/10.1080/00036846.2013.844328

Dräger, L., & Nghiem, G. (2020). Are Consumers' Spending Decisions in Line with an Euler Equation? *The Review of Economics and Statistics*, *103*(3), 580–596. https://doi.org/10.1162/rest{_}a{_}00909

Engelberg, J., Manski, C. F., & Williams, J. (2009). Comparing the Point Predictions and Subjective Probability Distributions of Professional Forecasters. *Journal of Business & Economic Statistics*, *27*(1), 30–41. https://doi.org/10.1198/jbes.2009.0003

Garbarino, E., & Strahilevitz, M. (2004). Gender differences in the perceived risk of buying online and the effects of receiving a site recommendation. *Journal of Business Research*, *57*(7), 768–775. https://doi.org/10.1016/S0148-2963(02)00363-6

Garriga, A. C. (2023). Box A: Public Confidence in the Bank of England. *National Institute UK Economic Outlook*.

Gorodnichenko, Y., & Sergeyev, D. (n.d.). *Zero Lower Bound on Inflation Expectations*, NBER. https://www.nber.org/papers/w29496

Gwartney-Gibbs, P. A., & Lach, D. H. (2016). Sex Differences in Attitudes toward Nuclear War: *Journal of Peace Research*, *28*(2), 161–174. https://doi.org/10.1177/0022343391028002003

Hey, J. D. (1984). The Economics of Optimism and Pessimism. *Kyklos*, *37*(2), 181–205. https://doi.org/10.1111/J.1467-6435.1984.TB00748.X

Jacobsen, B., Lee, J. B., Marquering, W., & Zhang, C. Y. (2014). Gender differences in optimism and asset allocation. *Journal of Economic Behavior & Organization*, *107*, 630–651. https://doi.org/10.1016/J.JEBO.2014.03.007

Jonung, L. (1981). Perceived and Expected Rates of Inflation in Sweden. https://www.jstor.org/stable/1803477

Kim, G., & Binder, C. (2020). Learning-through-Survey in Inflation Expectations. *SSRN Electronic Journal*. https://doi.org/10.2139/SSRN.3790834

Krifka, M. (2009). *Approximate Interpretations of Number Words: A Case for Strategic Communication*, Humboldt Universität, Zentrum für Allgemeine Sprachwissenschaft.

Leung, C. (2009). The demographics of household inflation perceptions and expectations. *Reserve Bank of New Zealand Bulletin*, *72*(2), 34–42. https://www.rbnz.govt.nz/-/media/project/sites/rbnz/files/publications/bulletins/2009/2009jun72-2leung.pdf

Lin, Y. C., & Raghubir, P. (2005). Gender differences in unrealistic optimism about marriage and divorce: Are men more optimistic and women more realistic? *Personality and Social Psychology Bulletin*, *31*(2), 198–207. https://doi.org/10.1177/0146167204271325

Lindén, S. (2015). Quantified Perceived and Expected Inflation in the Euro Area - How Incentives Improve Consumers Inflation Forecasts. *Joint European Commission - OECD Workshop on International Development of Business and Consumer Tendency Surveys*.

Lusardi, A., & Mitchell, O. S. (2007). Baby Boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics*, *54*(1), 205–224. https://doi.org/10.1016/J.JMONECO.2006.12.001

Lusardi, A., & Mitchell, O. S. (2008). Planning and Financial Literacy: How Do Women Fare? *American Economic Review*, *98*(2), 413–417. https://doi.org/10.1257/aer.98.2.413

Lyons, K. S., Stewart, B. J., Archbold, P. G., & Carter, J. H. (2009). Optimism, Pessimism, Mutuality, and Gender: Predicting 10-Year Role Strain in Parkinson's Disease Spouses. *The Gerontologist*, *49*(3), 378–387. https://doi.org/10.1093/GERONT/GNP046

Malmendier, U., & Nagel, S. (2016). Learning from Inflation Experiences. *The Quarterly Journal of Economics*, *131*(1), 53–87. https://doi.org/10.1093/QJE/QJV037

Palmqvist, S., & Strömberg, L. (2004). *Households' inflation opinions - a tale of two surveys* (No. 4), Sveriges Riksbank. https://archive.riksbank.se/Upload/Dokument_riksbank/Kat_publicerat/Artiklar_PV/ER04_2.pdf

Pfajfar, D., & Santoro, E. (2010). Heterogeneity, learning and information stickiness in inflation expectations. *Journal of Economic Behavior & Organization*, *75*(3), 426–444. https://doi.org/10.1016/j.jebo.2010.05.012

Reiche, L., & Meyler, A. (2022, February). *Making Sense of Consumer Inflation Expectations*, European Central Bank. https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2642~f96823e5de.en.pdf?a6b9965facced0d1ecc25de9a5a4f94d

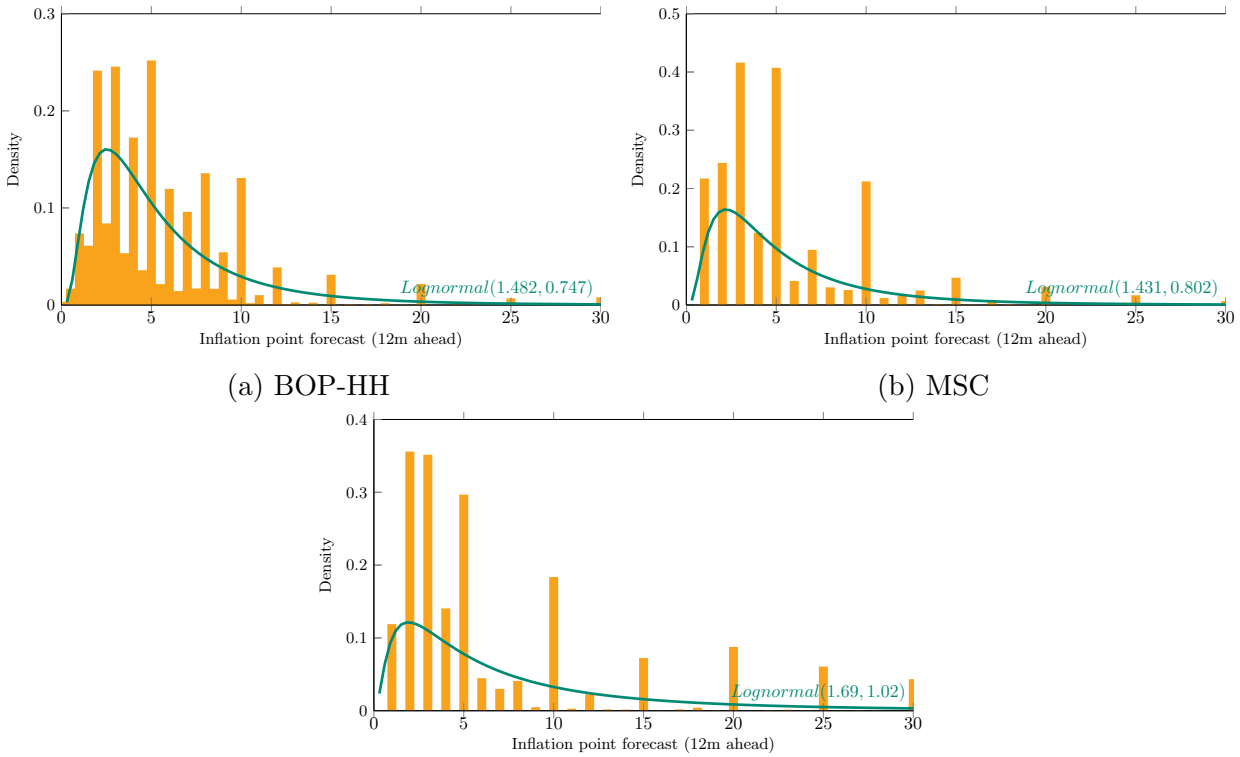
Silverstein, M. J., & Sayre, K. (2009). The Female Economy. *Harvard Business Review*. https://hbr.org/2009/09/the-female-economy

Vellekoop, N., & Wiederholt, M. (2019). Inflation Expectations and Choices of Households. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3383452

A Additional Material for Bayesian Framework

A.1 Motivating Log-Normality

The cross-sectional distribution of point forecasts is in line with a log-normal posterior. Figure A.1 shows the histograms of the pooled cross-sections of three surveys, the BOP-HH, the MSC and the SCE. The fitted log-normal parameters are shown for each survey.



(a) BOP-HH

(b) MSC

(c) SCE

Figure A.1: Histogram and fitted distribution of inflation expectation point forecasts

Notes: Distribution of inflation expectations (measured as point forecasts over 12 months) pooled across all time periods in three surveys (BOP-HH, MSC and SCE). The log-normal distribution is fitted to the data.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; Federal Reserve Bank of New York (FRBNY), SCE, June 2013 - November 2020; University of Michigan, Survey Research Center, MSC, January 1978 - January 2023; own calculations

A.2 Algebraic manipulations to derive the log-normal posterior

The prior is defined as

$$\log\theta \sim \mathcal{N}\left(\mu_0, \frac{1}{\tau_0}\right),$$
$$p(\theta) = \frac{\sqrt{\tau_0}}{\theta\sqrt{2\pi}} \exp\left(-\frac{\tau_0(\log\theta - \mu_0)^2}{2}\right).$$

The unbiased signal is defined as

$$\log x = \log\theta + \epsilon,$$
$$\text{where } \epsilon \sim \mathcal{N}\left(0, \frac{1}{\tau_x}\right),$$
$$p(x|\theta) = \frac{\sqrt{\tau_x}}{x\sqrt{2\pi}} \exp\left(-\frac{\tau_x(\log x - \log\theta)^2}{2}\right)$$

I compute the posterior following Bayesian updating:

$$\begin{aligned}
&p(\theta|x) \propto p(\theta)p(x|\theta) \\
&= \frac{\sqrt{\tau_0}}{\theta\sqrt{2\pi}} \exp\left(-\frac{\tau_0(\log\theta - \mu_0)^2}{2}\right) \frac{\sqrt{\tau_x}}{x\sqrt{2\pi}} \exp\left(-\frac{\tau_x(\log x - \log\theta)^2}{2}\right) \\
&= \frac{\sqrt{\tau_0}\sqrt{\tau_x}}{\theta x 2\pi} \exp\left(-\frac{1}{2}\left[\tau_0\left((\log\theta)^2 - 2\mu_0\log\theta + \mu_0^2\right)\right.\right. \\
&\left.\left. + \tau_x\left((\log x)^2 - 2\log x\log\theta) + (\log\theta)^2\right)\right]\right) \\
&\propto \frac{1}{\theta}\exp\left(-\frac{1}{2}\left[(\tau_0+\tau_x)(\log\theta)^2 - 2(\tau_0\mu_0 + \tau_x\log x)\log\theta\right]\right).
\end{aligned}$$

That this is proportional to a log-normal distribution,

$$p(\theta|x) \propto \frac{1}{\theta}\exp\left(-\frac{\hat{\tau}(\log\theta - \hat{\mu})^2}{2}\right),$$

where

$$\hat{\mu} = \frac{\mu_0\tau_0 + \tau_x\log x}{\tau_x + \tau_0},$$
$$\text{and } \hat{\tau} = \tau_0 + \tau_x.$$

A.3 Comparative statics

A.3.1 The effect of increasing signal volatility

$$\begin{aligned}
\mathrm{E}(\theta|x) &= \exp\left(\hat{\mu} + \frac{1}{2\hat{\tau}}\right) \\
&= \exp\left(\frac{\tau_0\mu_0 + \tau_x \log x + \frac{1}{2}}{\tau_x + \tau_0}\right) \\
\frac{d\mathrm{E}(\theta|x)}{d\tau_x} &= \left(\frac{2\tau_0(\log x - \mu_0) - 1}{2(\tau_x + \tau_0)^2}\right) \times \mathrm{E}(\theta|x) \\
&< 0 \text{ whenever } 2\tau_0(\log x - \mu_0) - 1 < 0 \Rightarrow \log x - \mu_0 < \frac{1}{2\tau_0}
\end{aligned}$$

A.3.2 The effect of decreasing prior precision

$$\begin{aligned}
\mathrm{E}(\theta|x) &= \exp\left(\hat{\mu} + \frac{1}{2\hat{\tau}}\right) \\
&= \exp\left(\tau_0\frac{\mu_0 + \tau_x \log x + \frac{1}{2}}{\tau_x + \tau_0}\right) \\
\frac{d\mathrm{E}(\theta|x)}{d\tau_0} &= \left(\frac{2\tau_x(\mu_0 - \log x) - 1}{2(\tau_x + \tau_0)^2}\right) \times \mathrm{E}(\theta|x) \\
&> 0 \text{ whenever } 2\tau_x(\mu_0 - \log x) - 1 < 0 \Rightarrow \mu_0 - \log x < \frac{1}{2\tau_x}
\end{aligned}$$

B Financial Literacy

B.1 Questions in BOP-HH survey wave 25, January 2022

W25: In the following section, we would like to ask you a few more questions on general economic topics.

Question: Let us assume you have a balance of €100 in your savings account. This balance bears interest at an annual rate of 2%, and you leave it there for five years. How high do you think your balance will be after five years? 1. Higher than €102
2. Exactly €102
3. Lower than €102
Don't know
No answer

Question: Let us assume that the interest paid on your savings account is 1% per year and the inflation rate is 2% per year. After one year, do you think you will be able to buy just as much, more, or less than you could today with the balance in your savings account? 1.

More than today
2. Just as much as today
3. Less than today
Don't know
No answer

Question: Do you agree with the following statement? "Investing in shares of a single company is less risky than investing in a fund containing shares of similar companies." 1. Agree
2. Disagree
Don't know
No answer

B.2 Questions in the SCE, asked only new respondents

QnumIntro. Next, we would like to ask you five questions to see how people use numbers in everyday life. Please answer the following questions by filling in the blank.

QNUM2. Let's say you have $200 in a savings account. The account earns ten percent interest per year. Interest accrues at each anniversary of the account. If you never withdraw money or interest payments, how much will you have in the account at the end of two years?
$\underline{\$\ \ }$
No answer

QNUM8. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account? 1. More than today
2. Just as much as today
3. Less than today
No answer

QNUM9. Please tell me whether this statement is true or false: Buying a single company's stock usually provides a safer return than a stock mutual fund. 1. True
2. False
No answer

B.3 Predicting financial confidence scores

Table 8: Explaining financial literacy through financial confidence variables

	Correct answers in financial literacy test (0-3)	
	BOP-HH	SCE
	(1)	(2)
age	−0.002	0.01***
	(0.003)	(0.0004)
female	−0.59***	−0.69***
	(0.08)	(0.01)
single	0.28**	0.06***
	(0.11)	(0.01)
income	0.12***	0.10***
	(0.02)	(0.003)
educ	0.07***	0.26***
	(0.01)	(0.004)
round	−0.16	−0.61***
	(0.10)	(0.01)
refresher	−0.04	−0.41***
	(0.26)	(0.02)
qeasy	0.44***	
	(0.06)	
qinterest	0.25***	0.06***
	(0.05)	(0.01)
Time dummies	No	Yes
Between effects	No	No
Region dummies	Yes	Yes
Observations	2,916	113,165

*p<0.1; **p<0.05; ***p<0.01

Notes: Regression coefficients of an ordered logistic regression of demographic variables (age, female, single, income and educ) and financial confidence predictors discussed in section II on the number of correct responses in the financial literacy test.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; own calculations

B.4 Financial Confidence and Uncertainty

In the framework low financial confidence is modelled as a flat prior, i.e. as high uncertainty around one's point forecast. I show that my financial confidence score is indeed negatively correlated with uncertainty around point forecasts. For this is use the interquartile range of fitted probability distributions as in Engelberg et al. (2009) and Armantier et al. (2013) and plot a binscatter in Figure B.1.

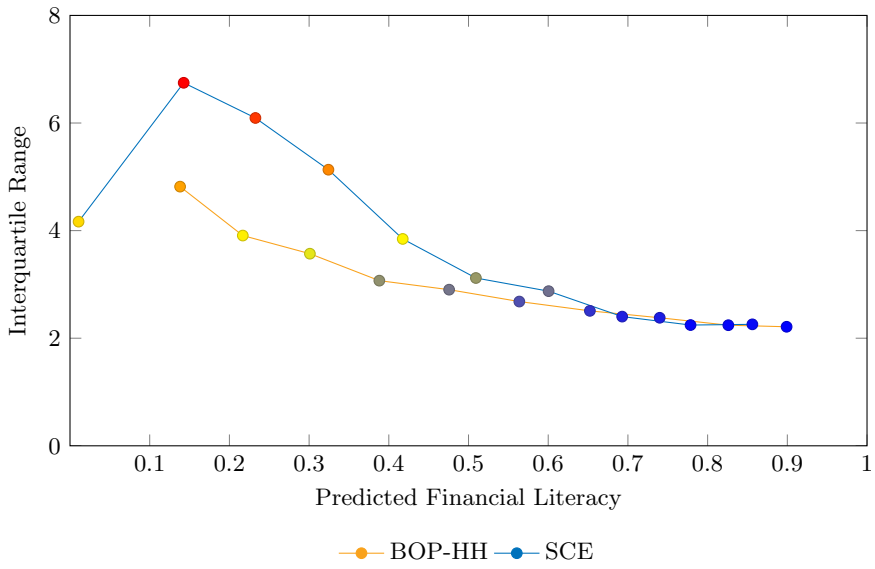


Figure B.1: Binscatter of interquartile range and predicted financial confidence

Notes: Average interquartile range per predicted financial confidence bin, where the full sample is split into 10 bins of equal size. The BOP-HH is shown in the dots connected by the orange line and the SCE is connected by the blue line. The data is pooled across all time periods. No controls are included.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; Federal Reserve Bank of New York (FRBNY), SCE, June 2013 - November 2020; own calculations

C Additional Empirical Material

C.1 The role of demographics

I verify that the gender gap in inflation expectations cannot be explained by standard demographic variables such as age, income and education, which may be distributed differently for men and women. To do so, Table 9 shows their interaction effects with female. For realistic values of age, income and education, despite a negative correlation with female, the gap persists.

Table 9: The gender gap and demographic controls

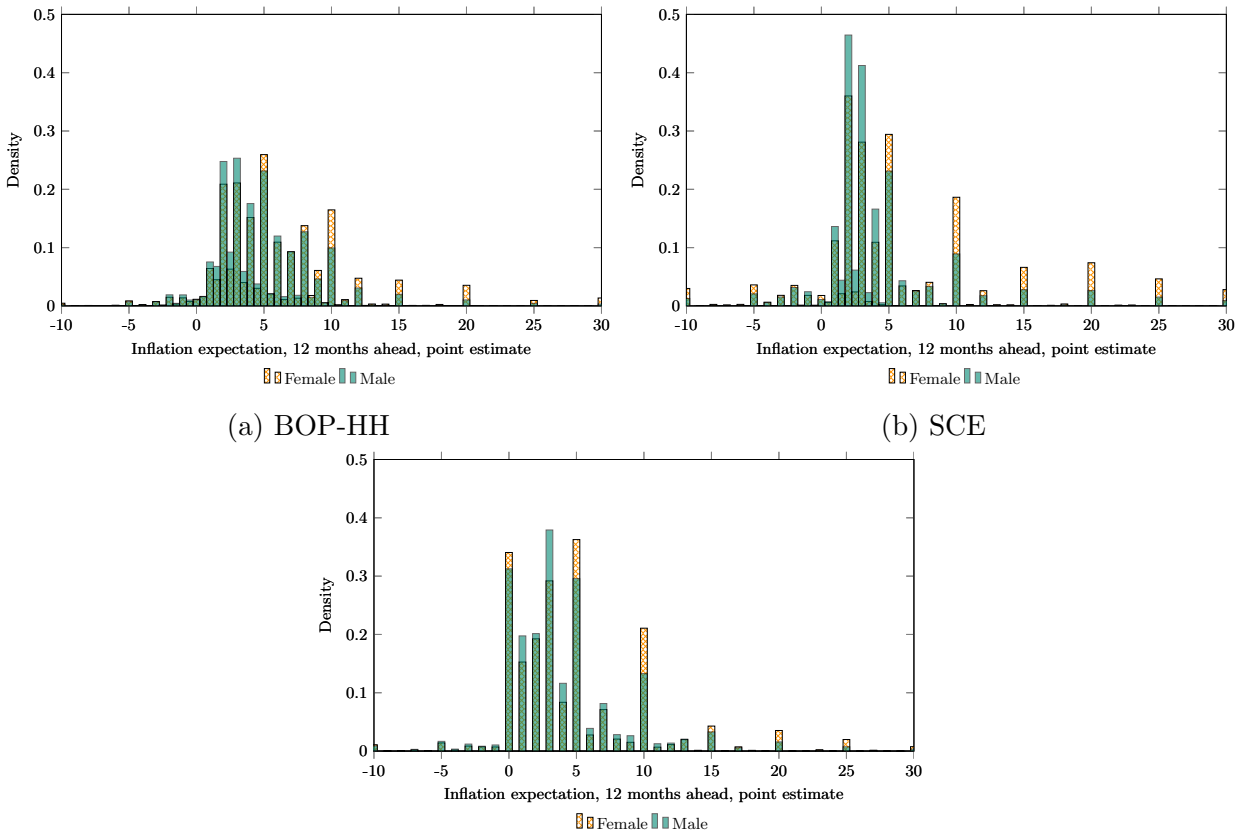
	Inflation expectation (12 months ahead, point estimate)					
	BOP-HH		SCE		MSC	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	5.53***	4.66***	8.50***	7.66***	7.30***	6.20***
	(0.20)	(0.22)	(0.38)	(0.41)	(0.26)	(0.26)
female	1.30***	3.63***	1.64***	3.46***	0.86***	3.17***
	(0.04)	(0.21)	(0.07)	(0.35)	(0.02)	(0.10)
age	−0.02***	−0.01***	0.01***	0.01***	−0.02***	−0.01***
	(0.001)	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)
income	−0.20***	−0.15***	−0.38***	−0.34***	−0.0000***	−0.0000***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.0000)	(0.0000)
educ	−0.09***	−0.06***	−0.50***	−0.33***	−0.24***	−0.10***
	(0.01)	(0.01)	(0.02)	(0.03)	(0.01)	(0.01)
single	−0.45***	−0.45***	−0.07	−0.09	−0.004	0.002
	(0.05)	(0.05)	(0.08)	(0.08)	(0.03)	(0.03)
female x age		−0.01***		0.01*		−0.02***
		(0.003)		(0.005)		(0.001)
female x income		−0.12***		−0.10***		−0.0000***
		(0.02)		(0.03)		(0.0000)
female x educ		−0.09***		−0.36***		−0.30***
		(0.01)		(0.05)		(0.02)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Between effects	Yes	Yes	No	No	No	No
Observations	111,085	111,085	115,491	115,491	261,375	261,375
R^2	0.12	0.12	0.03	0.03	0.12	0.12

*p<0.1; **p<0.05; ***p<0.01

Notes: Regression coefficients of a pooled OLS estimation of individual inflation expectations (12 months ahead, point estimate), on the dummy variable female, a continuous variable age, and the ordered categorical variables education and household income. Standard errors in parentheses below.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; Federal Reserve Bank of New York (FRBNY), SCE, June 2013 - November 2020; University of Michigan, Survey Research Center, MSC, January 1978 - January 2023; own calculations

C.2 Histogram



(a) BOP-HH

(b) SCE

(c) MSC

Figure C.1: Histogram of inflation expectation point forecasts of men and women

Notes: Distribution of male and female inflation expectations (measured as point forecasts over 12 months) pooled across all time periods. There is one plot per survey. The figures show that the distribution is more right skewed for women and rounded numbers (i.e. multiples of 5 or 10) are chosen more frequently.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; Federal Reserve Bank of New York (FRBNY), SCE, June 2013 - November 2020; University of Michigan, Survey Research Center, MSC, January 1978 - January 2023; own calculations

C.3 The role of financial confidence in the SCE

I replicate the results on financial confidence with data from the SCE to provide external validity by extending to a different time period and geography and internal validity by providing robustness of the financial confidence measure. Table 10 shows the regression output and Figure C.3 visualizes. Note, there are no between effects included in the SCE analysis, as demographic variables are only elicited once per respondent and thus never time varying.

Table 10: The impact of financial confidence on the gender gap (SCE)

Survey: SCE	Inflation expectation (12 month ahead, point forecast)				
	(1)	(2)	(3)	(4)	(5)
Constant	8.40***	7.13***	6.15***	7.86***	7.68***
	(0.37)	(0.38)	(0.38)	(0.37)	(0.37)
female	1.63***	1.10***	1.81***	1.37***	1.81***
	(0.07)	(0.07)	(0.09)	(0.07)	(0.11)
$P(\hat{test} = 3)$		−6.18***	−7.13***		
		(0.35)	(0.36)		
$P(\hat{test} = 3)$×female			−4.44***		
			(0.30)		
fin_lit_test				−1.02***	−0.86***
				(0.05)	(0.06)
fin_lit_test × female					−0.33***
					(0.06)
age	0.01***	0.02***	0.02***	0.02***	0.02***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
single	−0.05	−0.001	−0.01	−0.02	−0.03
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
educ	−0.51***	−0.33***	−0.24***	−0.41***	−0.41***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)
income	−0.37***	−0.29***	−0.25***	−0.33***	−0.33***
	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)
Time dummies	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes
Between effects	No	No	No	No	No
Observations	113,165	113,165	113,165	113,165	113,165
R^2	0.03	0.03	0.03	0.03	0.03

*p<0.1; **p<0.05; ***p<0.01
Standard errors in parentheses below.

Notes: Regression coefficients of a pooled OLS estimation of individual inflation expectations (12 months ahead, point estimate) in the SCE on the dummy variable $female_i$, predicted confidence and actual financial literacy test scores. Since the SCE's panel structure cannot be used due to crucial demographic questions being asked only once, there are no between effects for this survey. The full model can be found in Equation 8.

Sources: Federal Reserve Bank of New York (FRBNY), SCE, June 2013 - November 2020; own calculations

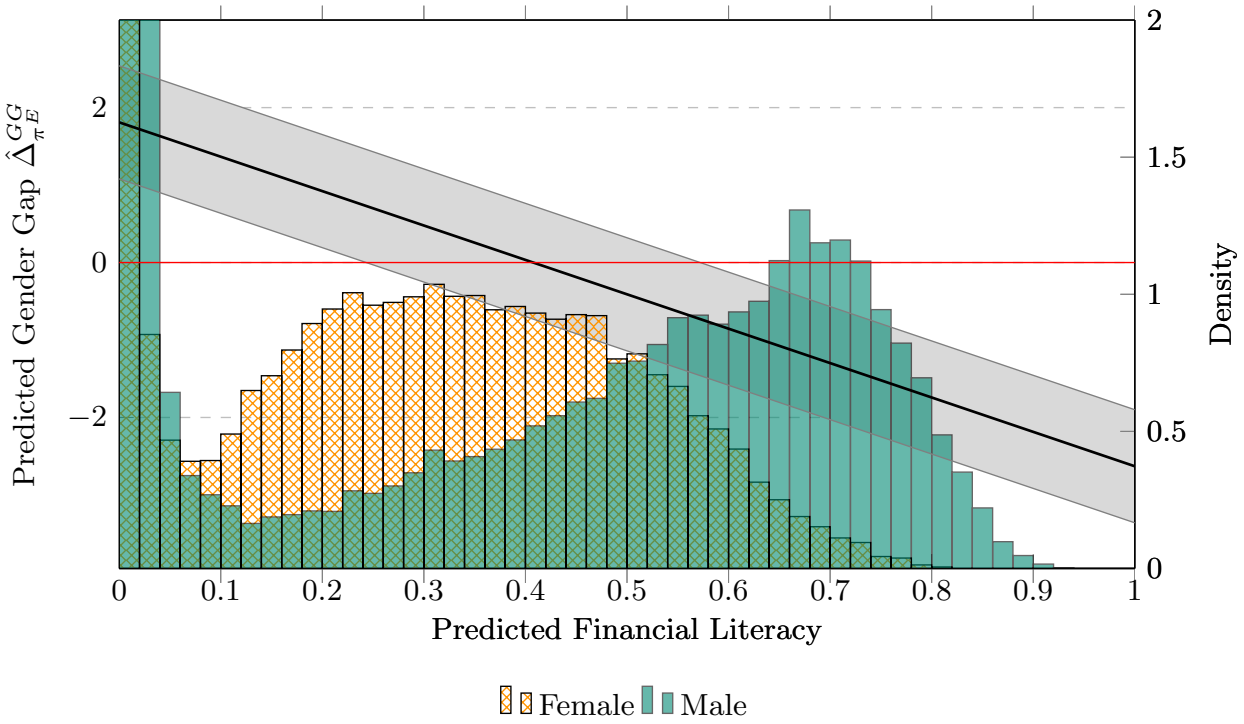


Figure C.3: The gender gap for different levels of financial confidence (SCE)

Notes: The black line plots the predicted gender gap along all possible values of the financial confidence score in the black line ($\hat{\Delta}_{\pi^E}^{GG}(x) = 1.81 - 4.44x$). The full regression results are shown in Table 10, column (3). The grey area indicates 95% confidence bands (standard error: 0.3725). The histograms show the density of the male (blue) and female (orange) distribution of financial confidence scores.

Sources: Federal Reserve Bank of New York (FRBNY), SCE, June 2013 - November 2020; own calculations

C.4 Regression in the deciles

Table 11 provides the full regression output for Figure 3 in the main body. The full model can be found in Equation 9.

Table 11: Quantile regression

	Inflation expectations (12 months ahead, point estimate)				
	Bottom 20%	Bottom 40%	Bottom 60%	Bottom 80%	Full Sample
Survey: BOP-HH					
female	−0.58***	−0.40***	−0.16***	−0.03	1.07***
	(0.05)	(0.03)	(0.02)	(0.02)	(0.04)
single	0.32***	0.21***	0.11***	0.07***	−0.37***
	(0.07)	(0.04)	(0.03)	(0.03)	(0.05)
age	0.005***	0.01***	0.004***	0.01***	−0.02***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
educ	0.05***	0.03***	0.01***	0.002	−0.07***
	(0.01)	(0.005)	(0.003)	(0.003)	(0.01)
income	0.12***	0.07***	0.04***	0.01***	−0.17***
	(0.01)	(0.01)	(0.01)	(0.004)	(0.01)
Observations	25,186	45,977	70,455	92,161	111,085
R^2	0.06	0.06	0.10	0.25	0.15
Survey: MSC					
female	−0.03**	−0.06***	0.07***	0.03***	0.83***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)
single	−0.04*	−0.02**	−0.02**	−0.02	0.10***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)
age	0.001**	−0.0000	−0.002***	−0.002***	−0.01***
	(0.001)	(0.0003)	(0.0003)	(0.0003)	(0.001)
educ	0.02***	0.04***	0.03***	0.03***	−0.30***
	(0.01)	(0.004)	(0.004)	(0.004)	(0.01)
income	0.0000***	0.0000***	−0.0000***	−0.0000***	−0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Observations	73,834	143,278	199,150	213,444	261,374
R^2	0.38	0.54	0.56	0.56	0.32
Survey: SCE					
female	−1.10***	−0.75***	−0.68***	−0.33***	2.17***
	(0.07)	(0.05)	(0.04)	(0.04)	(0.06)
single	0.16*	0.13**	0.12**	0.05	−0.20***
	(0.08)	(0.06)	(0.05)	(0.04)	(0.07)
age	−0.01***	−0.004**	−0.0003	0.003***	−0.002
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
educ	0.33***	0.21***	0.19***	0.08***	−0.71***
	(0.03)	(0.02)	(0.02)	(0.01)	(0.02)
income	0.21***	0.14***	0.12***	0.06***	−0.46***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	43,196	65,389	74,175	92,712	115,491
R^2	0.37	0.41	0.42	0.43	0.24
Time dummies	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes
Between effects	Yes	Yes	Yes	Yes	Yes

*p<0.1; **p<0.05; ***p<0.01
Standard errors in parentheses.

Notes: Regression coefficients of the panel model in Equation 9 for the bottom 20% (1), 40% (2), 60% (3) and 80% (4) in the inflation expectations distribution.

Sources: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BOP-HH, April 2020 - September 2022; Federal Reserve Bank of New York (FRBNY), SCE, June 2013 - November 2020; University of Michigan, Survey Research Center, MSC, January 1978 - January 2023; own calculations